THE DAFFODIL JOURNAL

Quarterly Publication of
THE AMERICAN DAFFODIL SOCIETY, Inc.

VOLUME I—NO. 1
SEPTEMBER, 1964

DEDICATION

It is difficult to realize that it has been nearly three years ago that, within the short span between the planting season of 1961 and the bloom season of 1962, we lost the two greatest daffodil hybridizers (raisers) in many of our lifetimes. It would be impossible to determine accurately the magnitude of the betterment of the daffodil, or of its popularity, that may be directly attributed to these two great Irish gentlement: two men who were close personal friends as well as staunch rivals.

The multitude of fine varieties they raised now constitutes well over 50% of any collection of up-to-date daffodils, as well as a major proportion of the stocks being offered by most of the largest commercial growers. And perhaps even more important than their rare gift for hybridizing was the unerring eye they possessed for selection. It is this critical eye for selection that is such a determining factor in a hybridizer's success.

Yet of even more import was the warm encouragement and the readily given advice and counsel from their deep store of knowledge and experience.

There does not exist the gift to pay adequate tribute to these two departed aristocrats and titans of the daffodil world, but at this late date, it is with humble pride, with privilege, and with sincere appreciation that we dedicate this first issue of our new **Daffodil Journal**

TO THE MEMORY OF

J. LIONEL RICHARDSON

and

GUY L. WILSON

The DAFFODIL JOURNAL

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Volume I Number 1

SEPTEMBER, 1964

OFFICERS

JOHN R. LARUS, *President*
67 Wyndwood Road, West Hartford, Conn. 06107

WILLIAM G. PANNILL, *First Vice President*
Box 31, Martinsville, Va. 24112

MRS. BEN M. ROBERTSON, *Second Vice President*
Box 123, Taylors, S. C. 29687

MRS. E. E. LAWLER, JR., *Secretary*
Box 327, Alexandria, Va. 22313

MRS. GROVER F. ROENNFELDT, *Treasurer*
1120 Craig Road, Creve Coeur, Mo. 63141

For the complete current roster of Officers, Directors and chairmen of committees reference should be made to the American Daffodil Society BULLETIN issue of May, 1964.

THE DAFFODIL JOURNAL is published for delivery to members in the months of March, June, September and December.

Editor
MRS. HOWARD B. BLOOMER, JR.
"Shore Acres," Rt. 2, Box 35
Lorton, Va. 22079

Executive Editor
WILLIS H. WHEELER
3171 North Quincy St.
Arlington, Va. 22207

Articles and photographs (glossy finish) on daffodil culture and related subjects are invited from members of the Society. Manuscripts should be typewritten double-spaced, and all material should be addressed to the Executive Editor.

DEADLINE FOR THE NEXT ISSUE WILL BE JANUARY 15, 1965.

SCHEDULE OF MEMBERSHIP DUES IN THE AMERICAN DAFFODIL SOCIETY

Individual Annual ..... $5 a year or $12.50 for three years.

Family Annual ..... $7.50 per year for husband and wife, or $18.75 for three years, with one copy of the JOURNAL.

Individual Sustaining Member ..... $7.50 per year.

Individual Contributing Member ..... $10 or more per year.

Commercial Memberships are three times the foregoing amounts.

CONTENTS

EDITORIAL

The American Daffodil Society completed its first ten years this spring. With the beginning of our second decade we inaugurate our new quarterly publication, the **Daffodil Journal.** It is intended to have the Fall Issue each year contain the Symposiums, the Membership Roster, and other articles. The other three issues will be smaller.

During the past decade there have been multiple changes in many of our lives, but none to compare with the onward march of improvement in the Daffodil, or with the strides made by our Society.

The Daffodil has undergone a striking alteration in appearance. We now have really RED "red cup" 2a's and 2b's; a number of whites that open white, and that have somewhat better constitutions; reliable, smooth reverse bicolors in several divisions; pinks that no longer fret the imagination; the sensational new doubles that have good form and color plus the necessary strong stems and necks; first and second generation hybrids in Divisions 5, 6, and 7 that are showing major improvement; miniatures being raised and shown that promise strides in vigor and quality; the first red trumpet (1a); et cetera. The Daffodil has veritably stepped into haute couture since our Society's founding in April, 1954.

But the American Daffodil Society has also shown advance and vigor: an increasing number of popular, quality daffodil shows; a rapidly expanding corps of accredited and student judges produced by our schools; a valued awards program; an increased membership; a material gain in the number of growers of first rate daffodil collections; an increase in favor for miniatures, with a committee actively working to keep an "approved list" current; the auspicious and path-breaking project of the Daffodil Data Bank with pertinent vital statistics on daffodils available from a computer; a solidification and an improvement in taste as to what constitutes a "good" daffodil; and perhaps most important of all, an expanding number of individuals undertaking hybridizing programs that portend American bred varieties of improved vigor that may be readily adapted to our wide range of growing conditions. These and other gains attest the growth and virility of the A.D.S.

However, to continue to advance, we **must** have a larger membership! The success and expansion of our new publication, the **Daffodil Journal,** is dependent upon more income. (Our budget for 1965 devotes 75% of estimated membership dues income to our publications.) Every member should hold himself responsible for gaining one new member. And to assure this new member's interest and membership permanency, share a good bulb or two with him in return for "signing on the dotted line." Do not accept a promise to join, but secure his dues and handle the application for him, then share your bulbs. Thereby we shall continue to flourish!

Harry I. Tuggle, Jr., Guest Editor

Said the Queen to Alice:

"You see, it takes all the running you can do to keep in the same place. If you want to get somewhere then you must run twice as fast as that."

ACROPOLIS

(See Page 19)

THE 1964 AMERICAN DAFFODIL SYMPOSIUM

HARRY I, TUGGLE, JR., *Chairman*
Symposium Committee
Martinsville, Virginia

After a year's lapse during which a synopsis of the results for the years 1959 through 1962 was presented, we are pleased to again present a current Symposium. This year's ballots were in (and tabulated) when the bloom season was fresh in our reporters' minds. Those cooperating in this project are thanked for their promptness. The 1964 results reflect considerable change over those of 1962, due partially to a different numerical value given the ratings on each ballot. It is felt that selections for first place merit a wider spread in value, so five, three, and one points were assigned to first, second, and third place selections, respectively. The tabulation represents reports from seventy three (73) members in thirty one (31) states.

The numerical scores are published for the first time in order to indicate relative voting strength on various varieties. However, it should be emphasized that recent or new introductions usually have lower scores because they are not yet as widely grown as others. Most reporters vote for a worthy novelty for exhibition when grown for a relatively short time, but vote for garden varieties is usually withheld until sufficient time has passed to assess performance.

Theoretically, the highest possible score this year is 400 points, due to weighting a few, selected ballots representing areas of culture from which few reports are received. This is done in order to give a sounder, more balanced picture of **national** performance.

There are no restrictions as to cost, time on the market, size, height, et cetera for daffodils eligible for inclusion, with the sole exception of excluding approved miniatures.

ITEM NO. 1. Trumpet, lemon or sulfur yellow (1a)

Exhibition:		*Garden*:	
1. Luna Moth	168	1. Moonstruck	127
2. Moonstruck	103	2. Hunter's Moon	99
3. Inver	90	3. Mulatto	98
4. Lemon Meringue	78	4. Grapefruit	87
5. Moonmist	66	5. Tintoretto	40
6. Grapefruit	21	6. Lemon Meringue	33
		Limelight	33

ITEM No. 2. Trumpet, self-yellow or gold (1a)

Exhibition:		*Garden*:	
1. Arctic Gold	168	1. Kingscourt	107
2. Kingscourt	165	2. Ulster Prince	99
3. Slieveboy	103	3. Garron	68
4. Golden Rapture	48	4. Goldcourt	64
5. Ulster Prince	41	5. Lord Nelson	52
Goldcourt	41	6. Arctic Gold	35
6. Royal Oak	32	7. Slieveboy	30

ITEM NO. 3 Trumpet, white perianth, colored trumpet (1b)

Exhibition:		*Garden*:	
1. Preamble	157	1. Trousseau	172
2. Trousseau	133	2. Effective	96
3. Frolic	117	3. Content	81
4. Newcastle	85	4. Foresight	58
5. Ballygarvey	69	5. Frolic	44
6. Effective	52	6. Ballygarvey	40

ITEM No. 4. Trumpet, self white (1c)

Exhibition:		*Garden*:	
1. Vigil	210	1. Beersheba	140
2. Cantatrice	196	2. Mt. Hood	122
3. Empress of Ireland	150	3. Cantatrice	81
4. White Prince	40	4. Vigil	68
5. Rashee	29	5. Broughshane	66
6. Broughshane	23	6. White Tartar	41
Glacier	23		

ITEM No. 5. Trumpet, reverse bicolor (1d)

Exhibition:		*Garden*:	
1. Lunar Sea	191	1. Spellbinder	101
2. Entrancement	123	2. Nampa	57
3. Nampa	90	3. Entrancement	30
4. Spellbinder	29	4. Lunar Sea	26
5. Moonlight Sonata	27		

ITEM No. 6. Large Cup, self yellow (2a)

Exhibition:		*Garden*:	
1. Galway	237	1. Carlton	133
2. Ormeau	175	2. Galway	85
3. St. Keverne	91	3. St. Egwin	84
4. Golden Torch	56	4. Ormeau	60
5. Lemnos	44	5. Golden Torch	54
6. Butterscotch	24	6. St. Issey	48
St. Egwin	24	7. Lemnos	38

ITEM No. 7. Large Cup, red or orange, yellow or perianth (2a)

Exhibition:		*Garden*:	
1. Ceylon	156	1. Ceylon	125
2. Court Martial	112	2. Armada	120
3. Foxhunter	70	3. Rustom Pasha	81
4. Vulcan	55	4. Matlock	65
5. Border Chief	52	5. Fortune	63
6. Air Marshal	45	6. Aranjuez	59
7. Armada	31	7. Craigywarren	29
8. Chemawa	25	Home Fires	29
Home Fires	25		

ITEM No. 8. Large Cup, yellow or light colored, white perianth (2b)

Exhibition:		*Garden*:	
1. Festivity	276*	1. Polindra	119
2. Green Island	82	2. Brunswick	89
3. Tudor Minstrel	70	3. Gold Crown	55
4. My Love	66	4. Green Island	53
5. Statue	41	5. Coverack Perfection	54
6. Tullyglass	25	6. Festivity	47
		Statue	47

*56 out of 73 votes for first place!

ITEM No. 9. Large Cup, red or orange, white perianth (2b)

Exhibition:		*Garden*:	
1. Arbar	186	1. Kilworth	233
2. Avenger	97	2. Selma Lagerlof	71
3. Kilworth	80	3. Fermoy	56
4. Signal Light	39	4. Buncrana	51
5. Daviot	33	5. Duke of Windsor	50
6. Fermoy	21	6. Alicante	41
Northern Light	21		

ITEM No. 10. Large Cup, self white (2c)

Exhibition:		*Garden*:	
1. Ave	170	1. Ludlow	81
2. Easter Moon	118	2. Ave	54
3. Knowehead	78	Zero	54
4. Ludlow	68	3. Truth	52
5. Zero	55	4. Courage	44
6. Early Mist	54	5. White Nile	37
7. Wedding Bell	26	6. Easter Moon	35
		Glendalough	35

ITEM No. 11. Large Cup, reverse bicolor (2d)

Exhibition:		*Garden*:	
1. Bethany	228	1. Binkie	304
2. Daydream	165	2. Lemon Doric	68
3. Rushlight	80	3. Limeade	55
4. Limeade	45	4. Cocktail	45
5. Halolight	35	5. Rushlight	31
6. Binkie	32	6. Daydream	23
		Nazareth	23

ITEM No. 12. Small Cup, colored, yellow perianth (3a)

Exhibition:		*Garden*:	
1. Ardour	220	1. Therm	104
2. Perimeter	80	2. Chungking	86
3. Chungking	77	3. Market Merry	74
4. Ballysillan	60	4. Ardour	61
Doubtful	60	5. Apricot Distinction	60
5. Jezebel	55	6. Dinkie	58
6. Therm	47	Jezebel	58

ITEM No. 13. Small Cup, color not predominant, white perianth (3b)

Exhibition:		*Garden*:	
1. Bithynia	144	1. Angeline	94
2. Carnmoon	124	2. Bithynia	77
3. Coloratura	118	3. Sylvia O'Neill	59
4. Aircastle	106	4. Carnmoon	52
5. Merlin	72	5. Misty Moon	49
6. Syracuse	57	6. Dreamlight	38
7. Corofin	41	7. Fairy Tale	26
Crepello	41	Lough Areema	26

ITEM No. 14. Small Cup, colored, white perianth (3b)

Exhibition:		*Garden*:	
1. Rockall	118	1. Limerick	164
2. Blarney	112	2. Blarney	136
3. Limerick	84	3. Matapan	82
4. Matapan	80	4. Kansas	55
5. Snow Gem	50	5. Mahmoud	29
6. Enniskillen	47	6. Bravura	28
		Snow Gem	28

ITEM No. 15. Small Cup, self-white (3c)

Exhibition:		*Garden*:	
1. Chinese White	269	1. Cushendall	120
2. Cushendall	90	2. Chinese White	97
3. Bryher	84	3. Bryher	58
4. Verona	47	4. Foggy Dew	48
5. Dallas	42	Frigid	48
6. Benediction	40	5. Silver Salver	43
Frigid	40	6. Dallas	30

ITEM No. 16. Double Flowers (4)

Exhibition:		*Garden*:	
1. Double Event	179	1. Cheerfulness	189
2. White Lion	88	2. Yellow Cheerfulness	100
3. Swansdown	83	3. White Lion	91
4. Falaise	47	4. Daphne	42
5. Bridal Crown	35	5. Mary Copeland	29
Gay Time	35	6. Camellia	27
6. Cheerfulness	32	Swansdown	27

ITEM No. 17. Triandrus Hybrids, Large Cup (5a)

Exhibition:		*Garden*:	
1. Tresamble	197	1. Thalia	153
2. Lemon Drops	123	2. Tresamble	131
3. King's Sutton	75	3. Stoke	118
4. Honey Bells	73	4. Forty-niner	60
5. Yellow Warbler	72	5. Moonshine	48
6. Rippling Waters	65	6. Rippling Waters	40

ITEM No. 18. Triandrus Hybrids, Small Cup (5b)

Exhibition:		*Garden*:	
1. Silver Chimes	228	1. Silver Chimes	154
2. Thoughtful	80	2. Dawn	83
3. Dawn	71	3. Thoughtful	51
4. Sidhe	65	4. Sidhe	44
5. Tincleton	25	5. Rosedown	18
6. Merry Bells	23	6. Tincleton	12

ITEM No. 19. Cyclamineus Hybrids, Large Cup (6a)

Exhibition:		*Garden*:	
1. Charity May	234	1. February Gold	144
2. Dove Wings	152	2. Charity May	102
3. Jenny	122	3. Peeping Tom	96
4. Woodcock	80	4. Dove Wings	64
5. Titania	38	5. Woodcock	58
6. Chickadee	23	6. March Sunshine	57

ITEM No. 20. Cyclamineus Hybrids, Small Cup (6b)

Exhibition:		*Garden*:	
1. Beryl	272	1. Beryl	290
2. Roger°	66	2. Roger°	39
3. Kitten	23	°Roger measures 6b.	

ITEM No. 21. Jonquilla Hybrids, Large Cup (7a)

Exhibition:		*Garden*:	
1. Sweetness	282	1. Sweetness	177
2. Shah	150	2. Golden Sceptre	102
3. Golden Incense	61	3. Shah	65
4. White Wedgewood	35	4. White Wedgewood	43
Golden Sceptre	35	5. Golden Incense	40
5. Golden Goblet	28	6. Golden Goblet	32
6. Waterperry	26		

ITEM No. 22. Jonquilla Hybrids, Small Cup (7b)

Exhibition:		*Garden*:	
1. Trevithian	200	1. Trevithian	245
2. Cherie	111	2. Golden Perfection	70
3. Tittle-tattle	64	3. Cherie	50
4. Susan Pearson	41	4. Tittle-tattle	45
5. Nancegollan	36	5. Lanarth	35
Sweet Pepper	36	6. Cheyenne	22
6. Golden Perfection	28	Orange Queen	22

ITEM No. 23. Tazetta Hybrids (8)

Exhibition:		*Garden*:	
1. Geranium	161	1. Geranium	171
2. Matador	109	2. Laurens Koster	80
3. Golden Dawn	83	3. Orange Wonder	64
4. Orange Wonder	71	4. Cragford	49
5. Martha Washington	61	5. St. Agnes	40
6. Cragford	57	6. Golden Dawn	38

ITEM No. 24. Poeticus Hybrids (9)

Exhibition:		*Garden*:	
1. Cantabile	216	1. Actaea	267
2. Milan	136	2. Cantabile	124
3. Actaea	131	3. Milan	45
4. Sea Green	76	4. Dactyl	44
5. Smyrna	51	5. Shanach	26
6. Shanach	15	6. Red Rim	22

ITEM No. 25. Pink Cups from Divisions 1, 2, or 3

Exhibition:		*Garden*:	
1. Radiation	124	1. Mabel Taylor	72
2. Accent	80	2. Mrs. R. O. Backhouse	56
3. Passionale	65	3. Carita	55
4. Salmon Trout	56	4. Radiation	50
5. Caro Nome	48	5. Rose of Tralee	49
6. Interlude	40	6. Interim	44
7. Fintona	38	7. Pink Rim	40
8. Rose of Tralee	30	8. Chiffon	32
9. Mrs. Oscar Ronalds	28	9. Mrs. Oscar Ronalds	22
10. Debutante	27	10. Rose Ribbon	20
11. Pink Isle	23	11. Roman Candle	19
12. Rose Royale	20	12. Foray ("Procession")	18

ROSE ROYALE

(See Page 22)

1964 DAFFODIL IMPRESSIONS

HARRY I. TUGGLE, JR.

Martinsville, Virginia

Experience has proven that an early Easter is often baneful for daffodil growers, and those of us on the Atlantic coast who had bloom **after** the winds and freeze of Easter weekend were certainly fortunate. Color in the red and pink cups was outstanding in many areas this year, and though the season was short, post Easter bloom was of high quality. Hybridizers and exhibitors in some areas had a field day in that "everything" seemed to be open at once.

I shall comment on varieties as they grow here in Martinsville, either in my planting or that of Bill Pannill. Any comment on items not yet grown by either of us will be so qualified. No particular hybridizer or firm has intentionally been favored, and as an honest poker dealer, every effort has been made to "call them as they fall." It must again be stressed that preference is shown for the exhibition or show types; however, noteworthy garden types and performance are noted each year. I feel that more emphasis should be placed on varieties that are good for **both** show and garden! The very best show type flower that requires infirmary treatment in order to give an occasional blue ribbon bloom is a nuisance to grow. Persistent demand should be instigated for varieties with better dispositions—vigor, disease resistance, and reliability—i.e. giving a high percentage of good bloom. After nearly 25 years and having personally grown 2000 varieties, 20% of which remain, I emphatically believe that the only reliable locale for judging a variety's complete worth or merit is in the garden.

The Roman numerals heading paragraphs in the following varietal commentary indicate Symposium items.

I. Luna Moth continues to give large, superb flowers with a tendency to stem weakness. Lemon Meringue and Moonmist are fine, and Moonstruck promises to be an outstanding, robust garden type. The unique, icy tints of Inver continue to intrigue. Moonshot and Up Front are new, worthwhile additions of this type.

II. There is scarcely any criticism of Arctic Gold as either show flower or long lasting garden subject—every bloom is a winner! Fine Gold is very early and deeply colored, it should be more widely grown. Golden Horn resembles its parent Kingscourt without the "hooding" perianth tendency. Beltany is relatively late and has the deepest color of any self yellow

this year. Viking is without reservation one of the best new 1a's on the market. Slieveboy is a large, smooth, medium yellow of good proportion. It is a vigorous plant, and not one flower of twenty could be faulted. The new Carrickbeg, as shown at Asheville, would appear to have everything. It is especially interesting that such a large, handsome yellow trumpet has a small, white, second generation cyclamineus hybrid (Titania) as its seed parent! Ulster Prince is giving better bloom in the lawn than in the prepared soil of exhibition beds, proving that pampering is not obligatory for some varieties.

III. Downpatrick is settling down and this year gave finer flowers than Newcastle. Downpatrick is not as deeply contrasted, but it has a whiter perianth that stands smooth and straight with no tendency to "hood." Prologue has replaced Foresight as a very early. It is neater and has exceptional lasting power. Descanso on first bloom shows promise, and Frolic continues to be the "best buy" in this group. Alpine Glow is a superlative, new pink trumpet (syn. for Radcliff's "Roslyn"), and Rima continues to have superb lilac pink trumpet color.

IV. Vigil continues to give superb bloom of the whitest white and to grow and increase with abandon. Vigil seems to give better flowers on second year down bulbs. Finola, with form and sparkling whiteness similar to Vigil, blooms later. Empress of Ireland, now fully settled, might be criticized only for its cream color when compared with whites such as Vigil and Finola. Out of fourteen blooms of "the Empress" over nine exceeded five inches in diameter, its form would be difficult to surpass, and its stem is perhaps the strongest of any 1c. Both Birthright and Queenscourt are being tempermental in settling to our climate, as was the case with Empress of Ireland. Chivalry is a smooth, very heavy substanced flower that is whiter and stronger stemmed than its parent Broughshane. For the garden it would be difficult to find a more impressive, large 1c than late blooming White Tartar. Petsamo and Brussels are excellent plants and are proving to be important parents. Riber, Matterhorn, Foaming Seas, and Ulster Queen will be reported on next year.

V. Lunar Sea is still our best 1d, and Honeybird promises it company. Nampa has given impressive large blooms.

VI. Galway and Ormeau, unquestioned leaders of the self yellow 2a's, now have competition from Butterscotch and Camelot. It is too soon to make a definite appraisal. The new Sunlit Hours is very large, smooth, evenly colored, and robust in growth.

VII. With somewhat pointed form and the hottest red cup color of any 2a grown here, Zanzibar blooms toward late mid-season making it even more valuable. For vigor, size, and showiness Matlock leads the parade as a garden subject. Court Martial, Air Marshal, Vulcan, Patagonia, and Border Chief annually give satisfaction. Chemawa is quite distinct—a smooth, rounded perianth with a nicely balanced cup of clear bright orange (without red) that has a penciled yellow frill. Kindled is valued for its late bloom. Firemaster and Firecracker have trim flowers with fiery cup color that vies with Zanzibar. Falstaff is displaying sharp color and smart form with a slight reflex to the perianth. We find a slight reflex attractive, and much to be preferred over petals "hooding" or "cupping", or turning inward on the margins. Paricutin is a flashy garden type with reliable color, but as yet we cannot grow it as large as it should be. Small sized Bantam is rounded in form, with cool yellow color and a rimmed cup. It should be valuable to miniature hybridizers. Eve Robertson's No. 18 (Dunkeld x Fortune) is always in the top ten 2a's (of over fifty) regardless of season, and a stronger, larger garden type than her No. 3 (Fortune x Porthilly) would be difficult to imagine. Ceylon grows and increases with such bounty—as well as its other good habits—that it is proving a reliable subject in the lawn! Better colored and larger Ceylon has not been seen on this side of the Atlantic than as grown by Mrs. S. S. Walker of this city. The answer for show type Ceylon specimens would appear to be liberal amounts of leaf mold!

VIII. Festivity is still easily the best of the well contrasted yellow large cups, and it has been observed that it gives best bloom when dug annually. It is so prolific here that I usually plant back only the single nose bulbs! Farewell with its glistening white perianth and pale citron yellow cup that fades to nearly white in our sun is outstanding for garden. The overall excellence of Green Island as a show flower, garden item, and parent scarcely requires mention! Prowess (introduced as "Elation") is even better each year and is almost 3c in character (a compliment). Ariel and Blarney's Daughter gave exceptional orangy-apricot color this year, and Fairy Mother has fascinating, delicate apricot tints in its crown. Joyous is immaculate, as is My Love, both of the pale yellow type. Abalone is large, with good form, and should be good for show or garden.

IX. Recently there has been so much progress in exhibition red cup 2b's that it is difficult to determine preference. Avenger is well proven and has reliable intense red color, smooth rounded form, and perhaps the heaviest substance of all its kin. Hotspur is larger and taller, with equally bright color, and somewhat similar is Norval with the decided asset of blooming here much

earlier than described. Victory is outstanding and blooms later than the three already mentioned. These highly colored, well formed flowers do not have as much sun resistance as their pod parent Kilworth. I continue to grow a good number of Kilworth because of its sun resistance, other good features for garden, and for cutting. Libya is tall, late, and has deep color that holds fairly well in our sun. Rathroe is also giving fine, late bloom. For garden, Alicante has a sunfast orange-red cup, as also does relatively early and effective Red April. Eve Robertson's No. 8-b (from Coverack Perfection x Rustom Pasha!) is very early, has good orange-red color that holds, and a lovely star shaped perianth. Perhaps, "one of these years" Eve can be persuaded to name and introduce some of her fine selections, nearly all of which thrive here in the South! Next year after Rameses and Don Carlos are bloomed, an attempt will be made to establish the "pecking order" (as termed by Dr. Tom Throckmorton) in the Kilworth x Arbar tribe!

X. Knowehead, Early Mist, and Easter Moon have not been dethroned, but the first two have recently given some base trouble. Todate, Wedding Gift is the only 2c (from over one hundred that have been grown) that hasn't given basal rot trouble here at one time or another. Older varieties often outdo themselves in order to remind us—to paraphrase—that all that glitters does not cost gold! Glendalough is one of these outstanding flowers that has not received merited attention. The stock of Pristine (Guy Wilson No. 42/4 from Broughshane x Greenland) gave magnificent flowers this year. Many measured to five inches, at the same time retaining grace and dignity. It is definitely large cup and not trumpet in character. The ever popular 2c's, although containing many fine flowers, need attention to breeding basal rot resistance perhaps more than any other type. There have been improvements in form, whiteness, and reliability of quality bloom, but more sturdiness is needed.

XI. Daydream, Bethany, and Rushlight are another leading trio. It is difficult to select a "best". The new Pastorale, as seen at Asheville, is of Daydream form, but is lighter in color. Limeade is almost trumpet in measurement and looks as if it may be one of the best for garden decoration, although most of this type are quite telling as garden plants! Rus Holland with its scalloped trumpet shaped crown (it measures 2d and not 1d as classified) is entirely different from others.

XII. Jezebel has all the 3a's beat for good color and sun resistance, but its petals tend to go wingy. One Symposium reporter described her, "Jezebel has bad habits but hot color." Doubtful and Perimeter are the most reliable show flowers, but

there is still no outstanding 3a for both show and garden. Older Goyescas is still in the running.

XIII. Some of the most appealing of all daffodils are in the yellow crowned or color not predominant 3b class! Coloratura, Syracuse, Greenmount, Clogheen, and Carnmoon are each indispensible. And newer introductions such as Eminent, Tranquil Morn, and Silken Sails make choosing even more difficult! I am going to continue to grow and to value all of them! Green Hills is still distinguished by having the most green yet seen in the cup for such a large flower. Nothing comes close to bright red rimmed Merlin. Its form, whiteness, clear red rim, scent, and anther insertion all suggest that its unknown pollen parent may well have been a first class poet. Corofin continues to set the standard for definitive rounded and smooth form, and though introduced years ago is still in short supply.

XIV. Rockall has justifiably been described as "standing alone." It is such a strong grower and produces such consistent top drawer bloom that it doesn't have time to concern itself with faster increase. Toreador has a clear, cherry red cup color found in no other red cup. Irish Splendor is slow in settling to our climate. Matapan and Kingfisher are noteworthy examples of the more classical Barrii or 3b form.

XV. Verona, Tobernaveen, and Dream Castle are the larger 3c's that offer Chinese White strong competition. New on the scene, and being grown for appraisal are Angel, Suilven and Wings of Song. The smaller, twinkling poeticus white small cups such as Dallas, Shagreen, Cushendall, and Silver Princess resemble the poets also in form and in cultural demands—they do better when left alone. These small charmers have new competition in Precision which blooms earlier. Deep green-eyed Benediction and its parent Bryher are intermediate between these two general types of white small cups. It is commendable to see so much activity in the favored 3c's, and some twenty-five named and numbered selections are under evaluation.

XVI. A once rather dull division is now taking on life and is no longer static thanks to the fertiliy of Falaise and its offspring Gay Time. The doubles are undergoing a major metamorphasis. More time is needed for acclimatization before an accurate appraisal can be made on reliability of opening in the South (i.e. to see if they continue not to blast). But the lovely white and red Acropolis (so lovely, that one Symposium reporter can only exclaim "Oh, Acropolis!"), the white and yellow Double Event, and the cream and orange Gay Time are proven in their good behavior and merit. Already available are white and red Monterrico, Anne Franck, and Bali Hai; yellow Papua and Fiji;

white Candida; and yellow and red Tonga, Hawaii, and Tahiti. All promise excitement and merit widespread testing. It is already established that these new doubles have better color and form and stronger stems than the doubles we have known heretofore. Gay Challenger is reported to be, and as seen in several slides, a breathtaking new white and red that will be on the market soon. Murray Evans in Oregon is doing extensive work on doubles utilizing Falaise and his own Falaise seedlings. He insists on doubles having good habits, and we hope some of his selections are in the offing. Some twenty Falaise children and grandchildren are being rated here for performance.

XVII. King's Sutton, an unregistered 5a from Australia, is turning in the best score among the self yellows, while Yellow Warbler, Lemon Drops, and Thoughtful (5a and not b in measurement here) are also good. Honey Bells has the best substance yet seen in a yellow 5a and is quite fertile. Merry Bells is a distinctive bicolor, and Forty-niner with its short stems is flourishing in the lawn. Short stems are a decided advantage in subjects for naturalizing. Horn of Plenty is recognized for being gross and vulgar in a class of charming, dancing flowers! No solid whites to compare with Eve Robertson's two seedlings from Thalia pollen have been seen.

XVIII. Sidhe is captivating with its intermediate size, small cup, delightful form, and cool color. Arish Mell portends a white 5b of quality—welcome news for those areas where Silver Chimes proves difficult. Silver Chimes has regrettably been discarded because it is suspect for being a carrier of stripe (virus).

XIX & XX. Second generation from cylamineus, white Titania and yellow-red Kitten are good show flowers and of much interest; however, they do not reflex as much as the first generation hybrids. Woodcock is the most handsome of the solid yellows grown here, and it has set some seed. Chickadee is a neat flower with an orange rim, and Satellite has a good orange-red cup color that is somewhat lacking in sun fastness. Bushtit has received several glowing accounts from Symposium reporters. With the increased number of first and second generation hybrids being grown, more interesting developments are promised.

XXI. Large, handsome Shah is now proving to be a vigorous lawn subject as well as being early and of show calibre. A recent import from New Zealand, Starfire has small, clustered florets with small precise blazing red crowns. It is refreshingly different! Waterperry also has several florets to the stem with long crowns of a distinct apricot tone. All white Alpine will be welcome.

GAY CHALLENGER

(See Opposite Page)

XXII. The red cups and reverse bicolors are causing much excitement in the small cup jonquil class. The glamour of Susan Pearson overawes the red cup types, but Suzy, Pin Money, Lisette and Highfield Beauty (the latter two recent imports from N.Z.) keep her in good company. The new Bunting will perhaps offer stronger competition. Parcpat and Prisk have been outdated. Dickissel and Pipit, the new reversed bicolors from Grant Mitsch, created quite a stir when displayed at Asheville! Nancegollan is a better white than Snow Bunting, and Mitsch T 6/5 opens white and lemon and goes to white. This sister of the reverses is smooth and vigorous.

XXIV. Having narrowed the poets down to seven or eight varieties, it is encouraging to see a new introduction this year in Perdita. It is reported that Grant Mitsch has a new poet that resembles a super Cantabile. New poets should meet a welcome reception, and more work needs to be done on these lovely types that close out the daffodil season!

XXV. Pinks in many cases need no longer be considered "pink." Alpine Glow and Rima, both pink 1b's of merit, were mentioned with the 1b's. Most of the other worthwhile pinks grown here are 2b's, with the notable exception of Caro Nome, the entrancingly colored and round formed 3b. One of the most exciting pinks here the past two years, and in the Richardson display at Asheville, was Rose Royale. Thus far every bloom has opened without fault, and in color it is an improvement on Salmon Trout which it resembles somewhat in form. Accent continues to flourish and to astound with its unique and intense color! Fintona has reliable rosey pink color, a clean white petal, and early bloom; its only drawback has been a recent weakness to basal rot. Infatuation is late, charming, and distinct—from baby pink on edge of crown it tints down through paler pink and ivory to an apple green center. It is the pollen parent of the highly heralded Romance. Of the pinks thusfar bloomed here, if only six could be kept they would be Accent, Alpine Glow, Caro Nome, Fintona, Infatuation, and Rose Royale (in alphabetical order), with Radiation added for good measure because of its bountiful bloom, reliable color and other good habits.

A cherished late pink is Chiffon which seems to get better every year. It is vastly superior to Wild Rose with which it is compared in catalogs. Debutante has good cup color and a fine white perianth, but only about one bloom in five is not torn or nicked when opening. After a number of years to settle, Salmon Trout now gives good bloom every year. Leonaine and Melody Lane are valued for their tendency to lilac pink. Pink Monarch and Woodlea, both near trumpet in measurement, are very good

when their perianth segments do not catch in crowns, a 50-50 proposition. Foray (introduced last year as "Procession") and Rose Ribbon are proven, showey garden stalwarts with bands of that often hot, tomato pink color. There is no bolder, stronger stemmed, or better colored decorative garden type than Carita whose pink is most reliable and lasting. It has regretably been subject to basal rot in this climate. Interim is appreciated for cutting and its felicity as a parent (e.g. Accent, Arish Mell, etc.) Over three dozen pinks under number and name were imported from Tasmania and New Zealand in 1962 and are now beginning to give good bloom. When fully settled they will be compared with some fifty named pinks plus new ones such as Knightwick, Marietta, Roselight, and Romance. The search continues for a variety that will set a pink hallmark.

XX#!*/- Division eleven is without doubt the proper burial ground for the assorted "gigantic orchid-flowering, papillon, collar, and split" types. A number of these travesties to the grace and beauty of a noble genus have been observed at shows, and a number of colored illustrations have been studied and shuddered over. My answer to the question, "Why should daffodils not have a split cup?", is that there is a proper place for these freaks and evolutionary throwbacks— PICKLED IN FORMALDEHYDE (FORMALIN) AND PLACED IN JARS ON THE NEAREST MUSEUM SHELF !

Bill Pannill continues to be a keen exhibitor, while I hold my "show" in the garden, allowing only flowers that are grown in quantity to be cut. We have both been severely infected by the hybridizing bug (wonder if it's a **virus**?), and that, added to full scale evaluation of novelties, makes more land a must!

THE 1964 AMERICAN MINIATURE DAFFODIL SYMPOSIUM

Helen C. Scorgie
Co-Chairman, Symposium Committee
Harvard, Massachussetts

Although daffodils had been hybridized sporadically for a much longer time, concerted efforts to improve garden clones began in earnest about the turn of the century. The Classified List is evidence of how assiduously this has been carried on. Miniatures are where standard daffodils were fifty years ago but with a different prospect. Standards were evolved from fewer species, most of which were readily adaptable to the garden. The much larger number of species involved adds greatly to the captivating variability of the miniatures although they may require more thoughtful nurture on this account. As with the standards, there have been miniatures hybridized for a long time. Dainty Minicycla dates back to the beginning of this century, and its pedigree and hybridizer are known. But there was then no general interest in the small daffodils.

The votaries of small daffodils will always be limited in number. But miniatures have many uses that should appeal to a wider group of daffodil growers and to other gardeners. Consideration should be given to this group as, without them, there is small chance that the bulbs wanted by the specialist will be readily available commercially. Miniatures are at present far too limited both in number of clones and in the number of bulbs available. It is doubtful if many of the miniatures now winning at some shows will be available from commercial sources. Also, very few new miniatures of American origin are available commercially, and the picture is not likely to change soon. On this point, Michael Jefferson-Brown wrote recently, "Some of the kinds shown by Sir Frederick Stern and Mr. Blanchard under names are seedlings of which only a very few (bulbs) are in existence: often one potful only. A case in point is Blanchard's Icicile. This is a beautiful white flower from Raindrop, but there remain only about half a dozen bulbs after almost ten years, I believe." Incidentally, about his own seedlings, Mr. Jefferson-Brown writes: "Of our real miniature hybrids, a series of much alike seedlings from N. rupicola x N. cyclamineus always attracts attention in the early spring with neat flowers intermediate between their parents. None has yet been named."

The current efforts of the miniature hybridizer should be to provide clones that will multiply as readily as the standards. Even if these were not sufficiently distinctive to be effective

together in the garden, they would be available to all who want to try miniatures. After all, standard daffodils have many closely similar cultivars as do all other popular sorts of flowers. The shortage of miniatures is acute, but two methods of producing proliferation in miniatures are available, each with its drawbacks. Miniature species or fertile cultivars may be crossed with intermediate or with short-stemmed standard daffodils. This may produce daffodils with stems too long, rather than true miniatures. But if they prove fertile, the chance of producing miniatures in the next generation is improved. When two miniatures are crossed, miniatures will result, but they are inclined to be sterile. Increase is often extremely slow, making them unprofitable commercially. A combination of these methods seems most promising. We may expect in time the sudden advent of "great parents" as has occurred in the case of the standards.

ITEM No. 1. Trumpets

1. Tanagra
2. Wee Bee
3. Little Beauty
4. Charles Warren

Tanagra retains its place easily, being first on many ballots. Almost the entire list of accepted trumpets is mentioned by one or another reporter. Most on the accepted list are selected and named forms of species, but it is good to see a garden hybrid heading the list. More would be welcome. There are quite a few species available as well as many attractive smaller trumpets. The hooded wild clones are most attractive in the small fry and should be developed, although there might be some prejudice against what is an unattractive feature in a standard trumpet.

Little Beauty had two complaints against it from warmer regions: that it was all leaves and no flowers, that it was hard to keep and too large anyway. Yet, it headed the list of a California reporter so a warm climate is not entirely the cause of its doing so poorly. Two reporters consider W. P. Milner too large. It is said that many would like to see Little Gem on the list. One grower writes, "It is the smallest 1c that I grow and should be on the list." Where there is a question of size in regard to inclusion, it would be well to err on the side of inclusion. A great many factors influence the size of a daffodil in the garden. The first consideration is whether or not the clone is correctly named. Miniatures are particularly liable to come misnamed,

and if they are of the correct division and color, the gardener is apt to assume that they are rightly identified. Then, climate and growing conditions affect the stem size. Moreover, there is no agreement as to the amount of fertilizer they should receive, varying from none to as much as the standards receive.

ITEM No. 2. Large cups

1. Goldsithney
2. Marionette
3. Tweeny
4. Picarillo

The large cups of standard size represent about 60% of the yearly crop of new daffodils, but I do not know of a single large cup miniature introduction in the last ten years! Yet, the material is there from which to produce them. Goldsithney led this group handily, although one reporter would like to see it removed from the list. There is complaint that Marionette and Tweeny are too large to show with the tiny ones. But there are others of the same approximate size, and the exhibitor could show the larger ones in a collection as well as smaller ones without being penalized if they were normal for their variety. The diminutive 2a, Morwenna, was praised by all who had seen it growing in the Darden garden. It provoked more comment and enthusiasm than any other candidate for the approved list.

ITEM No. 3. Triandrus

1. Hawera
2. April Tears
3. Frosty Morn
4. Raindrop

There is an element of uncertainty regarding the triandrus hybrids. The smaller ones frequently give trouble. Sometimes newly planted bulbs fail to come up in the spring, or foliage is, at first, produced with no bloom. April Tears is most frequently mentioned as being difficult. A gardener in the southeast reported no bloom from it for several years, then it started blooming every year, and now it heads his list. Another gardener from a less genial climate has twice lost bulbs their first winter. I do not believe this is a question of hardiness but of inherent weak-

ness, i.e. susceptibility to injury, possibly, drying out when it is dug. In the milder climate it would not have the strength to develop flowers, but in the colder regions the bulb would die.

The consensus of opinion among those who mention Kenellis is that it belongs in Division 11 rather than in Division 5. But as long as it remains in Division 5, it should not be penalized for its shape but should be appraised for its merits as a miniature. There is complaint that Cobweb, Samba and Tristesse are not true miniatures. But where else can they be exhibited? Surely they cannot compete with daffodils having stems twenty inches or more. They do conform to the criterion of the report accepted by the Society which says that they should not look well in a class of standard daffodils. But the report says nothing about how such items should look with other miniatures.

ITEM No. 4. Cyclamineus

1. Snipe
2. Mite
3. Tete-a-Tete
4. Quince

This group came near having three of the contenders tied for first place. Tete-a-Tete is especially popular as a garden flower, as well as being a fine show daffodil. Typical of the comment is, "Tops for garden, vigorous, good increase, long blooming period, also good for exhibition," and, "It is by far the best miniature I grow! Most prolific and most dependable. I had sixteen blooms this spring in a clump that was one bulb three years ago. The blooms last so long." The comment on The Little Gentleman contrasts interestingly the garden and show points of view. One reporter writes, "This one grows larger and taller each year for me. Too large!" Another notes, "The Little Gentleman has done well in two shows I have attended. It was selected as the best miniature at the Asheville show." Three cyclaminus hybrids are recommended for inclusion in the approved list: Flute, Jack Snipe, and Little Witch. Jack Snipe is too large for the rock garden here, but the other two are dainty.

ITEM No. 5. Jonquils

1. Kidling
2. Sun Disc
3. Demure
4. Sundial

Was this the year for Demure? This is the first time it has made the list, and it did so handily. Each year there is fresh enthusiasm for Kidling. It is too late for shows, but it prolongs daffodil garden bloom more than any other. Its easy ways make it readily available and a gently spreading delight in the rock garden. Sun Disc is even later here, permanent, and asking a minimum of care but not increasing as fast as Kidling. Lintie appears on a number of lists, sometimes highly rated. It is frequently seen at shows. The consensus of opinion is that it is good as a show flower but rather large. The same complaint is made of Bobbysoxer. Both are easy, good garden plants.

One writer says of this division, "Too many with not enough difference to make them distinctive." This is even more true in some divisions of the larger daffodils with less excuse. Miniatures are too few both in number of varieties (far less than one hundred in the accepted list) and in the number of bulbs available from dealers. Over the years, as more and better hybrids appear, some of these too-alike kinds will disappear from commercial lists. At least each one is a distinct and separate clone identified by a name which is all to the advantage of future gardeners.

Of Bebop, a gardener writes, "Not exactly a novely but I think mine had not bloomed for a year or two. I was particularly struck by the ample, round perianth and neat perfection of form; when the perianth faded, there was almost a second variety to enjoy."

ITEM No. 5. Tazettas

1. Cyclataz
2. Halingy
3. Pango
4. Angie

This division in its miniature forms is not reliable in the colder parts of New England. They are apparently hardy elsewhere although there are occasional notes of their disappearing. The old poetaz are all so reliable that one could wish a miniature in this division might appear which had some poeticus ancestry. Although the entire group comes in for listing, there is little comment on them, and what there is consists of mention of their impermanence and discussion of their size. One reporter writes, "Although Hiawassee was selected as the best miniature in our show this year, I wonder if it should be considered a miniature.

I suspect that climate has a great deal to do with these smaller tazettas. In favorable climes they are not all miniature." It is rather difficult to say from the reports what effect if any climate has on the size of Hiawassee. As there were no reports on it from north of Washington, D.C., one might assume that it is unreliable north of this point. A reporter disagrees with the move of Pango from Division 11 to Division 8. Pango has four species ancestors, **NN. pseudonarcissus, juncifolius, tazetta** and **poeticus,** approximately one fourth of each. Is it any wonder that it does not fit anywhere easily, except perhaps in the "glory hole," Division 11?

ITEM No. 7. Species and other wild forms, One flower per stem.

1. **N. rupicola**
2. **N. watieri**
3. **N. cyclamineus**
4. **N. asturiensis**

One senses a quickened interest in the species among the reporters. This is not surprising to those who know these charmers, but the beginner should try his luck first with the cultivars, or obtain garden-raised bulbs of the species. Garden bulbs raised from seed will be stronger and will have become adapted to garden conditions. They will not have dried out from a double journey, and will probably be larger, more mature bulbs that will bloom the first year.

It was obvious that a large number of reporters need to check on the status of these species as to the number of blooms per stem. The multiflowered species may often have single flowers, particularly on younger bulbs or those not having conditions entirely to their liking. Single-flowering species very rarely have more than one flower on a stem. As an example of these mistakes, **N. scaberulus** was listed four times: twice, correctly as multiflowered, and twice, incorrectly as single-flowered. It might have made the list if correctly placed!

I have wondered why **N. minor** is not more widely grown. We all love **N. asturiensis** for its early bloom, but why not grow **N. minor** also? It blooms nearer show time, is only slightly taller, and has a sturdier stem and better perianth.

N. rupicola which heads the list seems to be gaining yearly in popular esteem. No miniature could deserve this more. One

gardener praises it "for form, health, and persistance. This one and **N. asturiensis,** I should not be afraid to recommend to any reasonably careful gardener. And it is more fun to grow from seed. Both set seed bountifully in this climate. It is very easy to collect and plant, and bloom comes in four years with mighty little work." The same writer finds **N. cyclamineus** "harder to get going but so cute and early. How Wisley achieves those huge drifts of lanky ones so often pictured is still beyond us. But after much trying, we have some quite happy at a damp brookside spot." They seem contented here in New England in the raised edge of a little artificial bog, under a low-growing rhodora. As for the Wisley **cyclamineus,** I have always assumed that the constantly moist air pleased them.

Recommended for the approved list is **N. macleayi.**

ITEM 8. Species and other wild forms, more than one flower per stem.

1. **N. triandrus albus**
2. **N. calcicola**
3. **N. triandrus loiseleurii**
4. **N. fernandesii**

N. tenuoir

N. triandrus concolor

Note that in this group, two have only recently become available. However, these are both listed in the colder regions. One reporter there says, "None of this type is particularly good here. **Lacticolor** puts on its characteristic performance. It will bloom cutely one year. Another, it will appear to be riddled with stripe, and I'll throw a lot away. It will do well inside. It will sulk and bloom again."

Here again, the list might have been different if some reporters had not lost their votes in Item No. 7 . . . **Triandrus albus** had more than twice as many votes as its nearest rival, in part, probably due to its being the one most grown. **Calcicola** made a remarkable showing for its first appearance in this list. **N. triandrus pulchellus** is recommended by two growers for the approved list. It is said to be almost a bicolor and is seldom seen on commercial lists. **N. jonquilla** is also suggested.

Re. **N. fernandesii,** a writer comments, "When stocks of blooming-size bulbs are more generally available, I think that

this will prove a great favorite. It seems to multiply very slowly or only by seed, if my two bulbs given me in 1959 and still giving only one bloom stem apiece are typical. One year I had a large crop of seed but lost the seedlings. Of six bulbs purchased last year, not one bloomed. But the blooms I do get are so attractive and the stems so strong that I think very highly of it."

ITEM No. 9. Miscellaneous (Division 11)

1. Nylon
2. Jessamy
3. Elfhorn

Taffeta

This has never been a popular group. When it was a novelty, many bought Nylon and went no further. It would be interesting to know how many Nylon forms migrated to America. One British gardener reported six forms in his garden, but there must be many more. As the more distinctive ones were first selected for naming, those remaining are all probably pretty much alike, as they are from two varieties of the same species. Although perfectly hardy and easy to grow, they resent being moved and take their time returning to blooming. They need protection from icy winds.

ITEM No. 10. Any daffodils not included above

This item provided nothing but Xit and the two doubles. One reporter adds an additional note on the multiple Xit's. She writes, "I seem to have three forms from three bulbs purchased from Mr. Gray at the same time! One, I commented on before as being 'Not-Xit', the third differs from what I consider the true Xit in having less imbricated perianth and not quite so gleaming white color. The 'Not-Xit' has a cream cup. All three are appearing in shows I have visited or judged. It does seem unfortunate when the 'right' one is so perfect and so popular. I think the cream-cupped 'Not-Xit' deserves a name of its own."

BRER FOX

BRER FOX

The First Red Trumpet (1a) Daffodil

When Brer Fox was shown at the R.H.S. Show at London, in April, 1963, it elicited considerable comment in the British press, both from the viewpoint of its novelty, and for the fact that two or three bulbs were being offered for sale at 400 pounds, or $980.00 each . . . At that time the entire stock consisted of only six double nose bulbs and two offsets, and the price while certainly high is, we do not believe, the highest that single bulbs have brought in this century!

One London newspaper described Brer Fox as "not, of course, red but of that orange scarlet color that passes for red in daffodil parlance, and it is certainly the best of its kind so far produced. The trumpet is uneven at the edges*, although the perianth, a good rich golden yellow, is smooth enough." (*Ed. note "serrated") Rather than continue to quote published or unpublished commentary, we feel that a photograph is worth more than a thousand of such words, and that our membership would be interested in seeing a picture of a genuinely **new** type of daffodil.

As with most novelties, initial selling price amounts to what the traffic will bear, strongly influenced by "supply and demand." Regardless, the late William O. Backhouse devoted many years of his life developing this new type, and we do not feel that any criticism of form or color in such a trail-blazing achievement is justified. If the first hybrid white trumpet were just appearing on the market (and many of them still aren't WHITE), would it be reasonable to expect a flower with Empress of Ireland's form?

We welcome Brer Fox to these pages and look forward to growing it in the future—may it steer clear of the "briar patch"! H.I.T., Jr.

This is "George"

LET GEORGE DO IT

The Story of the A.D.S. Data Bank

DR. TOM D. THROCKMORTON
Director-at-large
Member, Breeding and Selection Committee

It's mighty hot in Hot Springs, Arkansas, during mid-October. I refer not only to the thermometer, which stood in the 90's each day, but also to the civic atmosphere. The dice at the crap tables were "hot." The coolest things in the late cabaret shows were the lightly clad ladies. The ponies weren't running at the track, but the hot springs were running faithfully in the various bath houses. As a matter of fact, the corridors of our hotel almost always looked like a surprise "fire drill" as they filled and emptied with scurrying figures clad in bathrobes and carrying towels. It was here in the autumn of 1963 the members of your official board gathered to consider the interim business of the American Daffodil Society.

The afternoon meeting followed a luncheon so delicious that I could do little but snooze. This relaxed attitude on my part was aided by the business of the meeting which concerned "miniatures." These little bitty-bodies became lost among my rows of daffodils which I grow like so much corn. The miniature forms really need a rock garden. Here on the prairies where we've been busily hauling rocks away for generations, to turn about and haul them back would cast some slight doubt on our sanity. Rock gardens are lovely but are more-or-less uncommon in these parts.

The faithful who have declared themselves for the "miniatures" are staunch folk; they adhere only to the true gospel: "miniatures aren't just little." As the true-believers mended their fences here and there, my own thoughts idly turned to a problem of more personal interest. At the Iowa Methodist Hospital, in Des Moines, Iowa, some of us are engaged in a program which applies electronic data processing to clinical medicine and surgery. In other words, how valuable is an electronic digital computer as a medical consultant? The possible advantages of a digital computer are:

(1) The computer can store a large memory.

(2) The computer never forgets.

(3) The computer can calculate rapidly.

(4) The computer is not biased by recent experience or personal feeling.

(5) The computer has almost instantaneous and "total recall," i.e., it calls up all the pertinent facts.

The application of such data storage and processing to a patient with a pain in his tummy was interrupted by the statement: " . . . and we should possibly institute a file or collection of known daffodil parentages."

I don't know who made this statement because the fog only lifted as I heard the last few words. But then and there the Daffodil Data Bank of the A.D.S. was conceived. The obvious way to store daffodil information, allowing accuracy and ready access, is in an electronic computer.

I leaned over and mumbled to Bill Pannill " A perfect job for a computer." Bill whispered back, "Let's go!" You see, Bill Pannill uses a computer for data processing in his business. He instantly saw the advantages of such a collection of data. Between the two of us, we persuaded your Board of Directors to approve a study in daffodil data processing (without cost to the A.D.S.) for a report to the Spring Board Meeting to be held in April 1964 at Asheville, North Carolina. This is the report.

The computer at the Iowa Methodist Hospital is called "George" for the obvious reason that life and custom being what they are, there is a great tendency to "let George do it." George's full name is I.B.M. 1440. To his lot fall many of the chores which are considered too tedious, too time consuming, too dull, or too unrewarding for human endeavor. His work extends from the interpretation of electrocardiograms on the one hand, to printing payroll checks with the other—checks from which George automatically deducts income tax withholdings, social security, insurance premiums, etc.; George consented to help the A.D.S. in his spare time.

Mrs. Roberta Watrous, Harry Tuggle, Bill Pannill and I discussed the type of data which we felt should be submitted to George. After a number of letters we decided upon:

(1) Name of daffodil

(2) Seed parent

(3) Pollen parent

(4) Breeder

(5) Classification and color code

(6) Season of bloom

(7) Height of plant

(8) Chromosome count

(9) Fertilty of seed and pollen

(10) Date introduced

(11) Duplicate names and "Apocryphia"

For George this is a kindergarten exercise: he can store up to two million items of information at a rate of 62,500 items per second. His "recall" of random bits of information is almost instantaneous, and he is capable of "printing out" his messages at a rate of 650 lines per minute, with 128 characters per line. Really the whole job is to supply accurate information to George. Presently there are punch cards on approximately 3200 daffodils in George's memory bank. The data on each of these cards were originally written out by me and were derived from: The **R.H.S. Daffodil and Tulip Year Books** from 1934 through 1964; from the **Annual Reports of The Midland Daffodil Society**; from **Herbertia**; and Mrs. Roberta Watrous, Mr. Harry Tuggle, Mr. Grant Mitsch, Mrs. J. Lionel Richardson, Mr. Thomas Martin, Mr. Michael Jefferson-Brown, P. De Jager & Sons, Inc., and from my personal correspondence with the late Guy L. Wilson. Grant Mitsch and Mrs. Richardson made information available to George from their breeding books; Thomas Martin produced a host of "lost" parentages, and Harry Tuggle proofread George's output with a friendly but critical eye.

Let us examine the information under the various categories:

(1) **Name:** Nineteen spaces are available for printing the individual daffodil's name. Less than a handful of names are longer, and suitable abbreviations easily come to mind.

(2) **Seed parent:** Alloted nineteen spaces. If the seed parent is definitely unknown, the spaces are left blank. If the seed parent is known with some degree of probability, the questionable name is followed by an asterisk. (Computers have no question marks in their language, so I substituted an asterisk which heretofore George had regarded without suspicion.) As a matter of fact, during one run of data processing, we lost the asterisk in the machine through utter perversity, and it required several hours to relocate it.

(3) **Pollen parent:** Rules of handling as applied to the seed parent, **vide supra.**

(4) **Breeder:** Suitable abbreviations of the breeders' name are supplied to George; but the computer prints out the full name on request.

(5) **Classification and color code:** George is letter perfect in the "Revised System for the Classification of Daffodils, 1950." Each daffodil, where possible, has been placed in the appropriate division, i.e., 1a, 2c, 3b, etc. However, it seems to both George and me that this system admirably codes the physical formation of the bloom, but the system is not sufficiently descriptive of the colors present in the flower.

Let me enlarge upon this, my favorite subject. Galway, Ceylon and Aranjuez are classified as 2a. Yet, Galway is a self-yellow; Ceylon is a red-cup, and Aranjuez has a yellow-cup rimmed with red. These differences are important to you and me, in our gardens, and to any judge on the show bench. A further example: Polindra, Debutante, Kilworth, Green Island and Interim are all classified 2b. Yet, does not their cup coloration make them vastly different flowers—and these differences are easy to describe.

George and I have worked out a color code which couples readily with the approved classification system; and which allows the computer to "print-out" a short color description of a bloom, where such a description is helpful. Colors used in daffodil descriptions are: yellow, white, red, orange, pink and green. The computer recognizes these colors. The daffodil perianth is solidly colored and in the first three divisions the perianth color is indicated by the classification system. But the cup colors, are left dangling. George and I have arbitrarily divided the cup (or trumpet) into three zones: the "eye zone" or the inner 1/3rd of the cup lying adjacent to the perianth; the "middle zone" or middle 1/3rd of the cup; and the "rim" or outer 1/3rd of the daffodil cup. Colors may be coded in sequence which describe these areas.

Let us see how this works: Polindra 2by, which George prints as Polindra 2b yellow. Debutante 2bp or Debutante 2b pink. Kilworth 2bgrr, or Kilworth 2b green-red-red. Green Island 2bgwy, or Green Island 2b green-white-yellow. Interim 2byyp, or Interim 2b yellow-yellow-pink.

Unlike the above, in divisions 4 through 11, the first color code applies to the perianth, and the remainder to the cup or

center. In these divisions, the standard classification has heretofore denoted only horticultural configuration, and there has been no connotation of color. These flowers are now more adequately described. Example: Double Event 4wwy is printed out to indicate a double daffodil with a white perianth and a white and yellow center. Thoughtful 5ayy indicates a long-cup triandrus with yellow perianth and cup. Dove Wings 6awy brings to mind a long-cup cyclamineus with white perianth and a yellow cup. Sugar Bush 7bwo describes a short-cupped jonquil with a white perianth and an orange cup. And so on through the classification. I realize that it sounds complicated and confusing, but when George prints out his little accessory color descriptions, it is most convincing. A little later and he will show you.

(6) **Season of bloom:** This is based on the usual 1-6 periods of bloom, from 1=extra-early to 6=late. The numeral 7 is used to indicate varieties which bloom at odd times, such as certain fall or winter blooming sorts.

(7) **Relative height of plant:** The "operative word" here is **relative.** Daffodil heights are dependent upon climatic and cultural factors. Yet, a daffodil which grows "tall" in Iowa, probably does so in Connecticut, Alabama and California; to say nothing of England, Ireland, and Tasmania. The word "tall" is merely any grower's appraisal, against his own experience with other daffodils. The actual code is: 4=tall; 3=average; 2=short; 1=miniatures, by definition. Such **relative heights** are fairly constant; but measurements by inches are meaningless.

(8) **Chromosome count:** Seemingly few of these are recorded. George is avid for the knowledge, whether the count is 14 or 52.

(9) **Fertility:** It may be valuable to know whether a certain daffodil is commonly considered fertile or sterile. A simple code reminds George of these facts, if known. S=seed fertile; P=pollen fertile; O=sterile. Also, the computer has already supplied a large store of knowledge in this area. Any daffodil that has appeared in George's file as a parent, is automatically marked by the computer as fertile.

(10) **Date:** The last two figures of the date are recorded; the century is left up to the reader. 02 refers to 1902, and we won't have to worry for another 38 years.

TABLE 1

NAME	SEED PARENT	POLLEN PARENT	BREEDER		CLASS & COLOR	S	HT	CC	FT	DT
ABALONE	POLINDRA	GREEN ISLAND	GRANT E. MITSCH	2B	YELLO YELLO PINK	4	4			62
ACROPOLIS	FALAISE	LIMERICK	J. LIONEL RICHARDSON	4	WHITE WHITE RED	4				55
ANGEL	*	*	GUY L. WILSON	3C	GREEN WHITE WHITE	3				60
AVENGER	KILWORTH	ARBAR	J. LIONEL RICHARDSON	2B	RED	4				57
BERYL	CHAUCER	CYCLAMINEUS	PERCIVAL D. WILLIAMS	6B	YELLO ORANG		2			07
BETHANY	BINKIE	SEEDLING 1	GRANT E. MITSCH	2D		4	3			58
SEEDLING	KING OF THE NORTH	CONTENT	GRANT E. MITSCH							
BLARNEY,S DAUGHTER	BLARNEY	SEEDLING 1	J. LIONEL RICHARDSON	2B	ORANG ORANG YELLO				S	48
SEEDLING	SERAGLIO	AVIEMORE	J. LIONEL RICHARDSON							
BUTTERSCOTCH	GOLDEN TORCH	GALWAY	GRANT E. MITSCH	2A	YELLO	3	3			63
CAMELOT	KINGSCOURT	CEYLON	J. LIONEL RICHARDSON	2A	YELLO					
CHICKADEE	RUBRA	CYCLAMINEUS	GRANT E. MITSCH	6A	YELLO ORANG	3	2			61
DEBUTANTE	WILD ROSE	ROSE CAPRICE	J. LIONEL RICHARDSON	2B	PINK	3				56
DESCANSO	POLINORA	FROLIC	MURRARY EVANS	1B	YELLO	3	4			64
DESDAMONA	SEEDLING 1	RASHEE	GUY L. WILSON							
SEEDLING	BRUNSWICK	GREENORE	GUY L. WILSON							
DICKCISSEL	BINKIE	JONQUILLA	GRANT E. MITSCH	7B	YELLO WHITE	5	3			64
FINDLA	DUNLUCE	BROUGHSHANE	GUY L. WILSON	1C		2				58
GREENLAND	SEEDLING 1	CHINESE WHITE	GUY L. WILSON	2C		3			SP	49
SEEDLING	QUARTZ	NAXOS	GUY L. WILSON							
KING ALFRED	PS.OBVALLARIS MAX.	AUTO-TETRAPLOID	JOHN KENDALL	1A		2	4		SP	99
LORD KITCHENER	MINNIE HUME	WEARDALE PERFECTION	MRS. R.O. BACKHOUSE	2B	YELLO				SP	05
NEWCASTLE	NIPHETOS	KANCHENJUNGA	W.J. DUNLOP	1B	YELLO	3				57
NYLON	B.ROMIEUXII	B.MONOPHYLLUS	D. BLANCHARD	11	WHITE WHITE	7	1	28	SP	49
PEASE BLOSSOM	JUNCIFOLIUS	T.ALBUS	ALEC GRAY	7B	YELLO YELLO	5	1			38
ROSE ROYALE	SEEDLING 1	SALMON TROUT	J. LIONEL RICHARDSON	2B	PINK				SP	58
SEEDLING	ROSE OF TRALEE	LISBREEN	J. LIONEL RICHARDSON							
SAMBA	TRIANDRUS	*	BARR & SONS	5B	YELLO RED	4	1			52
SILKEN SAILS	GREEN ISLAND	CHINESE WHITE	GRANT E. MITSCH	3B	WHITE WHITE YELLO	5	4			64
WHITE SENTINEL	BEACON	SEEDLING 1	REV. GEO. H. ENGLEHEART	2C					SP	26
SEEDLING	*	*		2C						

The date used is the year of registration, unless this was preceded by considerable use of the flower in shows or in breeding.

(11) **Identical names and "Apocrypha":** Occasionally the same name has been given to two or three different daffodils. The computer indicates this repetition by a a code, which sets apart the older varieties no longer available.

Early daffodil breeders were legendary characters; and a vast store of tales, anecdote, information and misinformation has formed a fascinating "Apocryhpa". George has winnowed these data. Occasionally a breeder has assigned one parentage to a plant at one time, and a different breeding on another occasion. George has tried to judge these variations impartially; and, when unable to reach a decision, he has given both breedings with a coded symbol to indicate the discrepancy.

On yet other occasions when the parentage of an important daffodil has been unknown, famous breeders have hazarded educated guesses as to the identity of the unknown parents. The daffodil Fortune is a case in point. When P. D. Williams and the Rev. Engleheart discussed Fortune's possible ancestory, George took special note: the computer contains two **possible** parentages for Fortune. Both of these may well be wrong (and probably are!)—but a guess by "P.D." is better than an asterisk by George.

The above is an outline of the data that George mulls over. The computer may reproduce the facts, or it may sort and choose among them. These latter faculties enable George to do many things for us and are governed by the instructions which George has received—these instructions are known as the "program". George has been programmed by Bob Henderson, an I.B.M. engineer. The instructions or commands given the computer required 450 punched cards. This meant many hours which have actually been donated to the A.D.S. by Mr. Henderson and the I.B.M. Corporation. I would no longer hazard to estimate the hours I have put into this project.

Here are a few things that George can do for you:

(1) List out the information contained in the Bank about any or each daffodil. (See table 1.)

(2) List all daffodils bred by a given breeder. At the Asheville meeting of the A.D.S., George presented Mrs. J. Lionel Richardson with a complete and current list of her introductions.

(3) List all the known children of any daffodil or daffodil cross. As a case in point, the children of Green Island make a fascinating study.

(4) Provide lists by classification, as all 2b's; or provide lists by colors, as all pink daffodils.

(5) Lists may be printed as regards season of bloom, or height of plant—a list of miniatures could be provided. Certain chromosome counts could be ferreted out, or data concerning fertility is possible in list form.

(6) Even the dates are interesting. It is fascinating to print out the daffodils introduced in each decade, and to note how tastes change. It is possible to follow the influence of major breeders, or certain of their plants.

(7) George's most ambitious and sophisticated accomplishment is his ability to print out the family tree (to seven generations) of any daffodil recorded in the Daffodil Data Bank. As incredible as it sounds, the name of almost any daffodil can trigger the computer and within a few moments, the family tree of the plant is deftly printed out. Then without further command, George proceeds to list the total data contained on each daffodil concerned in the genealogy—in correct genealogic order. In other words George can supply a family tree, followed by a short biography of each member of the family.

This fall, a friend of mine, who lives in Virginia, obtained a bulb of Ulster Queen. Rumor has it that he paid American dollars and two units of blood. I just couldn't wait until April of 1965 to see this bloom, and inserted the name "Ulster Queen" into the computer. The family tree which George has printed out shows the stuff that really fine white trumpets are made of. Only someone like Guy Wilson could leave such a bequest to daffodil lovers. Ten breeders; two life times; tender loving care; and pseudo-narcissus obvallaris maximus is transformed into a glistening white trumpet—by magic and by labor. (See table 2)

And now to paraphrase: "Ask not what George can do for you; ask what you can do for George". What started as an experimental enterprise of the American Daffodil Society has now been accepted and dignified—George has been given the title of the Daffodil Data Bank. This is **your** bank and deserves your

1 ULSTER QUEEN

2 EMPRESS OF IRELAND

3 VIGIL

4 GUARDIAN

5 KANCHENJUNGA

6 COURAGE

7 KANCHENJUNGA

8 NIPHETOS
9 TROSTAN

10 SEEDLING
11 ASKELON

12 SEEDLING
13 ASKELON

14 SEEDLING
15 ASKELON

16 KING ALFRED
19 ASKELON

20 CONQUEROR
21 WHITE KNIGHT
22 SEEDLING
23 NEVIS

25 NAXOS
26 SEEDLING
27 NEVIS

28 CONQUEROR
29 WHITE KNIGHT
30 SEEDLING
31 NEVIS

36 PS.OBVALLARIS MAX.
37 AUTO-TETRAPLOID
38 SEEDLING
39 NEVIS

42 MADAME DE GRAAFF
43 MADAME DE GRAAFF
44 WEARDALE PERFECTION
45 DUKE OF BEDFORD
46 KING OF THE NORTH
47 SEEDLING

52 WEARDALE PERFECTION
53 DUKE OF BEDFORD
54 KING OF THE NORTH
55 SEEDLING

58 MADAME DE GRAAFF
59 MADAME DE GRAAFF
60 WEARDALE PERFECTION
61 DUKE OF BEDFORD
62 KING OF THE NORTH
63 SEEDLING

84 EMPRESS
85 PS.ALBESCENS
86 EMPRESS
87 PS.ALBESCENS
88 PS.ABSCISSUS
89 •

104 PS.ABSCISSUS
105 •

116 EMPRESS
117 PS.ALBESCENS
118 EMPRESS
119 PS.ALBESCENS
120 PS.ABSCISSUS
121 •

76 WEARDALE PERFECTION
77 DUKE OF BEDFORD
78 KING OF THE NORTH
79 SEEDLING

92 KING ALFRED
93 GLORY OF NOORDWIJK
94 TRIANDRUS
95 •

108 KING ALFRED
109 GLORY OF NOORDWIJK
110 TRIANDRUS
111 •

124 KING ALFRED
125 GLORY OF NOORDWIJK
126 TRIANDRUS
127 •

TABLE 2 (Part 1)

TABLE 2 (Part 2)

NAME	SEED PARENT	POLLEN PARENT	BREEDER	CLASS & COLOR	S	HT	CC	FT	DT
ULSTER QUEEN	EMPRESS OF IRELAND	VIGIL	GUY L. WILSON	1C					
EMPRESS OF IRELAND	GUARDIAN	KANCHENJUNGA	GUY L. WILSON	1C		2	3	SP	52
VIGIL	COURAGE	KANCHENJUNGA	GUY L. WILSON	1C		3	3	SP	47
GUARDIAN	NIPHETOS	TROSTAN	GUY L. WILSON	2B		3	4	SP	42
KANCHENJUNGA	SEEDLING 1	ASKELON	GUY L. WILSON	1C		2	3	SP	34
COURAGE	SEEDLING 1	ASKELON	THE BRODIE OF BRODIE	2C		3		SP	33
NIPHETOS			PERCIVAL D. WILLIAMS	2C		3		SP	27
TROSTAN	KING ALFRED	ASKELON	GUY L. WILSON	1B		2		SP	38
SEEDLING	CONQUEROR	WHITE KNIGHT	THE BRODIE OF BRODIE	1C					
ASKELON	SEEDLING 1	NEVIS	THE BRODIE OF BRODIE	1C				SP	23
SEEDLING	SEEDLING 2	NAXOS	THE BRODIE OF BRODIE						
KING ALFRED	PS.OBVALLARIS MAX.	AUTO-TETRAPLOID	JOHN KENDALL	1A		2	4	SP	99
CONQUEROR			PERCIVAL D. WILLIAMS	1B			2	SP	07
WHITE KNIGHT	MADAME DE GRAAFF	MADAME DE GRAAFF	DEGRAAFF BROS. LTD.	1C				24 SP	07
SEEDLING	WEARDALE PERFECTION	DUKE OF BEDFORD	THE BRODIE OF BRODIE	1B	*				
NEVIS	KING OF THE NORTH	* SEEDLING 1	THE BRODIE OF BRODIE	1C		2		SP	16
NAXOS			REV. GEO. H. ENGLEHEART	2C				SP	23
PS.OBVALLARIS MAX.				1D		2	3	14 SP	
AUTO-TETRAPLOID									
MADAME DE GRAAFF	EMPRESS	PS.ALBESCENS	DEGRAAFF BROS. LTD.	1C				31 SP	87
WEARDALE PERFECTION	PS.ABSCISSUS	*	WILLIAM BACKHOUSE	1B				SP	94
DUKE OF BEDFORD			BARR & SONS	1B				SP	99
KING OF THE NORTH	KING ALFRED	GLORY OF NOORDWIJK	THE BRODIE OF BRODIE	1A				S	27
SEEDLING	TRIANDRUS	*	REV. GEO. H. ENGLEHEART	1C					
EMPRESS	PS.BICOLOR	PSEUDONARCISSUS	WILLIAM BACKHOUSE	1B				SP	90
PS.ALBESCENS				1D				SP	
PS.ABSCISSUS				1D				S	
GLORY OF NOORDWIJK	MADAME DE GRAAFF	VICTORIA	J. DEGROOT AND SON	1B				SP	02
TRIANDRUS				1D				SP	

support. George would appreciate your help along the following lines of endeavor.

(1) If a breeder believes a daffodil is worth registering, then the parentage of that daffodil is worth knowing. The A.D.S. is dependent upon the R.H.S. for the proper registration of daffodils, a labor for which we are all grateful. But can we not expect the breeding of daffodils, where known, to become a part of the required information? If the breeding is uncertain, but a parentage is considered likely, this should be indicated, as well. George can handle information of this type, and we shall each stand to profit as the store of information increases.

(2) No public record is available of the parentages of many standard commercial daffodils—many of them of Dutch origin. If these parentages are lost, it is a great pity; if the lines of breeding are known, they should be made available. Dutch growers sell millions of beautiful healthy daffodil bulbs in the U.S.A. each year; I think we deserve to know the ancestors of the things we are planting.

(3) The varieties from the Antipodes need amplification and classification. Some of the most ardent daffodil growers (and breeders) live in New Zealand, Australia, and Tasmania. George needs access to their daffodil breeding books. Perhaps the editors of our new daffodil publication will countenance the following advertisement: **George, a digital computer with random access, desires contact with ardent Antipodean daffodil grower. Object: mutual advantage".**

(4) George needs little bits and pieces of information: color descriptions and data on older varieties which you have grown. Data on daffodils registered but not introduced. George needs fertility facts, chromosome counts, etc., etc. Each and any of you can help with a postal card, a note or a letter.

(5) George requires your advice regarding future ramifications of his efforts. If you wish, George could advise us of diseased varieties—certain entire daffodil clones are virus riddled. Certain apparently healthy varieties are infected also—"Typhoid Marys" of the narcissus world. George could provide this information if you think it important, and if **you** are willing to work at digging out the facts for George.

Along the same line, the computer could indicate whether or not certain varieties were susceptible or resistant to basal troubles—a very real problem in some parts of our country. You present the facts, and George will organize and bank them for you—for future reference.

Lastly, George is supplying his services without charge to the A.D.S. Daffodil Data Bank. George has expensive tastes, and it costs approximately $5,000 per month to maintain him in his air conditioned—plate glass suite. He depends upon a battery of ancilliary equipment, and needs the services of trained and expensive personnel. Nevertheless, George regards his services in the light of a restful diversion; there is always a compulsion to give time, energy, knowledge and pleasure to an interested friend.

George needs friends, too. Simple requests will be answered in spare time, and without charge. Complicated or long listings can be had for the postage and cost of materials—surely not more than a dollar or two.

Address:
GEORGE
Computer Center
Iowa Methodist Hospital
Des Moines, Iowa

Two other plant societies are fascinated by George's abilities—are you?

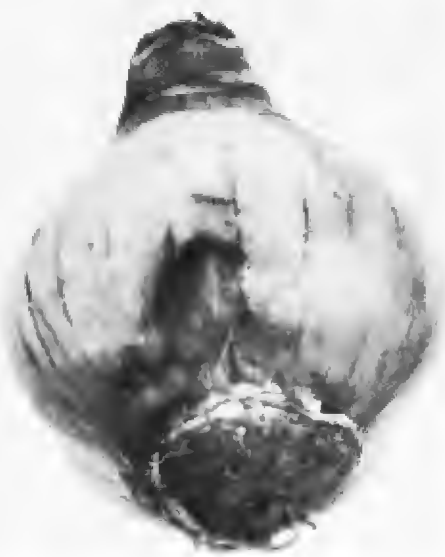
QUARTET AT ASHEVILLE

Mrs. H. B. Bloomer, Jr. (A.D.S. Editor), Charles Meehan (Chairman, 1965 Nominating Committee), Mrs. Lionel Richardson of Prospect House, Waterford, Ireland, and Mrs. Michael Gallucci (Chairman, 1965 Convention) form a foursome in front of the Richardson Display at the Asheville Convention, April 1964.

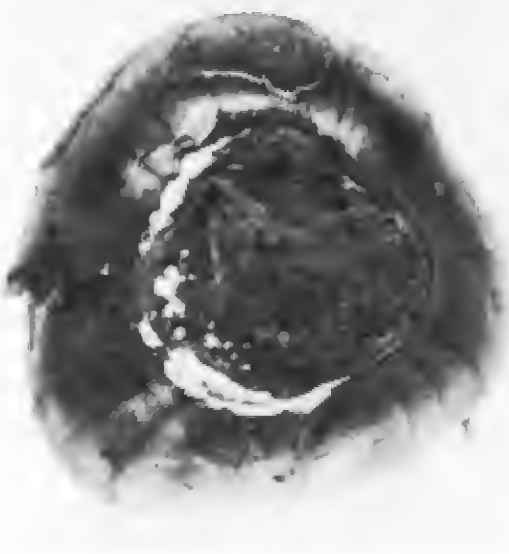
GRANT E. MITSCH

Recipient in 1964 of the Gold Medal of the Men's Garden Clubs of America, Grant Mitsch is pictured in one of his daffodil fields. Details of the award will be given in our next issue.

Basal Rot Symptoms



Surface view of a partially-rotted bulb.



Base of rotted bulb showing white growth of fungus around basal plate.

Longitudinal section of a diseased bulb.

Cross section of a diseased bulb.

WHAT IS BASAL, BROWN AND BOTHERSOME TO OUR BLOOMING BULBS?

CHARLES J. GOULD AND V. L. MILLER*

The answer of course is: BASAL ROT, a worldwide and serious problem to both amateur and commercial daffodil growers. It is usually worse in warm climates than in cool ones.

The effect of climate was forcibly demonstrated to us when temperatures were unusually warm at digging time in 1960 and 1961 in the customarily cool Pacific Northwest. The heat caused a sharp increase in basal rot in certain stocks. Fortunately, since then a combination of more normal (cooler) summer temperatures, and the increased use of recommended control measures by bulb growers is rapidly reducing the disease loss to its previous low level.

In warm climates infection often occurs during the growing season where it usually starts in the roots and progressses into the basal plate and scales. Such infection may occur late in the growing season, particularly with warm (65°-75°F) temperatures and ample soil moisture. The latter combination seldom occurs in the Pacific Northwest but is normal in the eastern and southern United States. Temperatures below 55°F retard infection. Infection in the Pacific Northwest usually starts during digging, cleaning, and grading operations when healthy and diseased bulbs are mingled together. This type of infection most often occurs at the base of the bulb but may begin elsewhere, particularly at wounds, bruises, sun-scalded areas, etc. As the harvested bulbs mature, they become increasingly resistant to infection, but with the onset of root formation the bulbs again become susceptible.

Most large trumpet varieties are susceptible, particularly the white and bicolor types. Golden Harvest is much more susceptible than the common King Alfred. The Jonquilla, Tazetta, Triandrus, and a number of cup types are usually resistant.

The disease is caused by the fungus **Fusarium oxysporum** f. **narcissi** (Cke. & Mass.) Sny. & Hans. The basal rots of iris, tulips and narcissus are caused by different forms of **F. oxysporum** that do not usually cross from one of these hosts to the others.

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*Plant Pathologist and Agricultural Chemist, respectively, Western Washington Experiment Station, Washington State University, Puyallup, Washington. Project 1512. The research reported herein was supported in part by a grant from the Washington State Bulb Commission.

Basal rot is seldom serious under forcing conditions, since temperatures are usually too low for optimum development; however, the rot may develop before the flatting or potting of bulbs, particularly if stocks are shipped under high temperatures or stored in warm warehouses.

Some symptoms that may be confused with basal rot are caused by heating, freezing, and methyl bromide. Overheating results in a brown decay, beginning first at the root initials and flower bud. Freezing injury causes tissues other than roots and flower buds to be discolored first. An overdose of methyl bromide (often used for insect control) produces a grayish-brown breakdown that progresses rather uniformly inward from the outer surface and along junctions of slabs and flower stems.

FUNGICIDES FOR BASAL ROT CONTROL

Proper cultural operations are essential for the control of basal rot. These include annual rotation of plantings, discarding of diseased bulbs, proper storage tempertures, etc. However, a dip in a fungicidal solution is also frequently necessary but, until recently, the average hobbyist or homeowner has had trouble getting suitable solutions.

For over twenty years we have been investigating fungicides for the control of basal rot. During that time over 1,000 chemicals have been tested, either in the laboratory or in the field. The best materials were of three types:

1. Certain antibiotics—which were too expensive;
2. Phenols — which were sometimes too phytotoxic (injurious); and
3. Mercurials.

The Ceresans were originally the most popular mercurials, but, while effective, they often caused injury. Following research by McClellan, Gould and Miller, and others, PMA (phenylmercury acetate) generally replaced the Ceresans because of lower cost, less phytotoxicity, and good control. However, the search for better compounds has continued. Recently, other promising mercury compounds have become available. One of these (ethyl mercury thiosalicylate) has been used for years by the average American for his cut fingers under the trade name of Merthiolate. The water solution is now available for agricultural use under the trade name of Elcide 73.

In our preliminary fungicidal tests we have been using in recent years basal rot infested stocks of bulbous iris instead of

narcissus because the iris are cheaper, are easier to handle, and have given comparable results. In tests on such iris during 1960-1961 and 1961-1962 Elcide was superior to all other materials tested.

Elcide has also given good results in tests by some of our commercial growers on narcissus, iris, and tulips. In addition, both experimental and commercial tests in Florida and other areas of the United States have shown it effective for the control of Fusarium rot of gladiolus corms.

Results from the use of this chemical may vary according to varieties used, location, handling, etc. The margin of safety in respect to bulb injury appears smaller than with PMA. The manufacturer recommends 1 quart of Elcide of the 12% formulation in 100 gallons of water for use on commercial bulbs. This rate may be satisfactory for general use on most bulbs in other areas of the United States and for use on daffodils as well in western Washington. However, our bulbous iris cannot stand as much mercury as can daffodils. Results of our tests indicate that 1½ pints (of the 12% formulation) in 100 gallons may be enough for disease control as well as safer for iris. Tulips are even more sensitive to mercury, but we have not yet tested Elcide on them.

The length of dipping time is very important. During 1962-1963 we compared the effect on iris bulbs of both 15 and 60 minute dips in Elcide at 1 quart (12% formulation) per 100 gallons of water. The 60 minute dip was injurious. It is probably only necessary to be certain that the bulbs are completely wetted with the solution to obtain adequate control.

Some mercurials are quickly inactivated or 'tied-up' by soil, metal, plant debris, etc., and the effectiveness of a product therefore may be much reduced by such reactions. We have made only limited studies on the inactivation of Elcide, but we would not expect a rapid breakdown of this product because it is similar in composition to "stabilized" solutions which we investigated intensively several years ago.

In view of the importance of this basal rot problem throughout the United States we are enlarging our investigations on fungicides. During 1964-1965 we hope to obtain answers to some of the problems always encountered with fungicides: What is the best compound to use on iris, tulips, and daffodils? What is the best rate to use? When should dipping be done (soon after digging, just before planting, or at both times)?

With financial help from the Washington State Bulb Commission and two companies we will be testing three promising

mercurials (PMA, Elcide and Morsodren), at two rates; at three dipping times; on two varieties each of iris, tulips, and daffodils; and with five replications of 100 bulbs each. This will involve a total of 63,000 bulbs.

Our experiments to date indicate that Elcide appears quite promising in western Washington. But it is possible that other mercury compounds such as Morsodren (formerly Morton Soil Drench) may give better results under different conditions of handling or in different climatic areas. Also, we still consider PMA to be an excellent fungicide for basal rot control when properly and consistently used.

Actually, we doubt that any dramatic improvement in disease control will arise until someone finds an effective fungicide that is systemic. Several companies are searching for such. Let's hope that they find it soon.

Phenylmercury acetate is sold under several trade names in different parts of the United States, often as a 10% solution. On daffodils, it is usually used at 1 part (active) in about 4,000 parts of water (1 lb/500 gal). The 10% formulation may be used at a rate of 1 ounce to 3 gallons of water. The dipping solution of PMA is not as stable as Elcide in the presence of soil and therefore should not be used for more than four dips nor held for more than one day before using. Elcide 73 is sold by Elanco Products Co. for commercial use in a 12% concentration and recommended by them at one quart in 100 gallons of water. The same fungicide is now being sold for home owner use under the name of "Greenfield Bulb Dip" in a 1% concentration with a label recommendation by the company of 4 ounces per 1 gallon water. The manufacturer's recommendations should always be followed not only for use on bulbs but also in handling. Elcide contains mercury and adequate precautions must be taken to avoid harmful exposure.

SOIL FUMIGATION AND BASAL ROT

During 1956 and 1957 Apt and Gould* studied the effect of various materials in controlling a nematode root rot of narcissus caused by **Pratylenchus penetrans** in certain limited areas of western Washington. Nematode populations were reduced by soil fumigants containing dichloropropenes, chloropicrin, methyl bromide, ethylene dibromide, and dibromochloropropane in de-

*Control of Root-Lesion Nematode, **Pratylenchus penetrans**, on narcissus. By Walter J. Apt and Charles J. Gould. Plant Disease Reptr. 45(4):290-295. April 15, 1961. Scientific Paper No. 2058.

scending order of effectiveness. Fumigation definitely increased yields of No. 1 King Alfred bulbs over nonfumigation. The value of fumigation was later corroborated in commercial tests. However, high rates of methyl bromide and, to a lesser extent, chloropicrin and dichloropropene increased losses from basal rot in these experiments.

The greater losses to basal rot in methyl bromide and chloropicrin treated plots were rather unexpected. Most, if not all, stocks of King Alfred daffodils contain a few infected bulbs. The basal rot fungus is not controlled by the hot-water+formalin treatment, which was given the bulbs in this test to eliminate crown rot (**Sclerotium rolfsii**), mites, etc. Therefore, the planting stock used in the tests probably contained some basal rot-infested bulbs. However, previous observations indicate that the basal rot fungus does not usually spread from infested to healthy bulbs in western Washington soils. This lack of appreciable spread had been attributed previously to low soil temperatures during the growing season, but the results with chloropicrin and methyl bromide in our tests indicate that competitive organisms in the soil may also normally retard growth of the parasite.

This is another indication of how complex the disease situation may be— seldom can we introduce a new factor into our culture without upsetting something else. The total picture therefore must be considered in applying any new treatment, as well as in interpreting the results.

GENERAL RECOMMENDATIONS FOR CONTROL OF BASAL ROT

1. Dig bulbs as early as practicable and in as dry weather as possible. Dry as rapidly as possible with good air circulation.

2. Avoid sunburning, bruising, or otherwise injuring the bulbs. Be especially careful when digging, cleaning, and grading.

3. Remove and destroy all diseased bulbs as soon as possible. (Discard all bulbs of severely infected stocks to prevent them from contaminating healthy stocks).

4. Store bulbs in thin layers at not over 55°-60°F. with good ventilation.

5. Dip bulbs in a mercurial solution such as PMA. If the loss from basal rot exceeds 1%, treat three to seven days after

digging and again just before planting. If the loss is less than 1%, treat only once, sometime after cleaning but before the root plates become swollen. Such a procedure is adequate in western Washington. Eastern hobbyists may find it preferable to consistently give their bulbs the double treatment.

6. Remove and destroy diseased bulbs again before planting.

7. Plant in cool, well-drained soil and as deep as practicable. To avoid warming the soil, the rows or holes should not be opened until just before planting.

8. Excessive nitrogen and phosphorus increase the loss from basal rot, while high potassium helps reduce it. Either avoid organic nitrogen fertilizers or mix them thoroughly with the soil early enough to permit decomposition before planting.

9. Do not replant bulbs on the same land more often than once every three years in cool areas such as the Pacific Northwest and less often in warmer regions.

10. Disinfect used trays and other containers in a solution of formaldehyde at a rate of one quart (U.S.P. formalin) in five gallons of water or in one of the mercury solutions already mentioned.

11. The cleaner the bulbs, the more effective the treating solutions will remain, regardless of soil type. Also, since mercury reacts with most metals, such surfaces as those of dipping cans should be protected with a rubber or plastic base paint. (DO NOT use lead paint.)

12. If heptachlor is added for insect control, the emulsifiable form is better than the wettable powder, since it inactivates less of the mercury compound.

13. Either plant the bulbs or dry them immediately after treatment.

14. Add formaldehyde to the hot water treatment (used for nematodes, etc.) to prevent spread of the basal rot fungus. After cooling the bulbs, dip basal rot-infected stocks in a mercury solution to provide residual protection.

15. All mercury compounds are **poisonous.** The user should wear heavy-duty rubber gloves and a rubber or plastic apron. Wash off the solution **immediately** (particularly the concentrated form) if it comes into contact with the skin. Warm temperatures increase the danger of injury from such materials.

16. Mercury injury to bulbs may occur if: (1) Immature bulbs are treated; (2) the solution is too strong; or (3) the treated bulbs are not dried rapidly. The centers of injured bulbs die and turn black; flowers are lighter in color, smaller, and the trumpets are shrunken.

17. Finally—remember to **read** and **follow** all directions on the manufacturer's labels.

Flowers from bulbs injured by incorrectly used mercury compound.

THE PROBLEM OF DAFFODIL VIRUSES

HAROLD S. KING, *Chairman*
Health and Culture Committee
Darlington, Maryland

When I wrote a short article on "Aphids, Virus and Daffodils"[1] the response was: "What's the use telling us what won't work! We want to know what to do." Many of our present methods intended for control, such as trying to kill the aphids which spread disease, are not effective and may even be a cause for the spread of virus. I must cite other procedures that are likewise ineffective and show how they, too, are in part responsible for our present deplorable situation. Finally, I am convinced that healthy stock can be propagated, so this article will end on a note of constructive optimism.

The literature on the virus diseases of daffodils is extensive, but a good introduction to the problem may be obtained from the following articles: "Investigations on Virus Diseases of Narcissus" by van Slogteren and Ouboter[2], "Narcissus. Virus Diseases" by McWorter[3], and "Narcissus Virus Diseases" by Broadbent, Green and Walker[4]. The nomenclature of the viruses is somewhat confused, and ultimately an international agreement among the virologists should resolve the differences. The English workers[4] stated that "using serological techniques we hope to sort out the complex of viruses affecting narcissi during the next few years."

The Lord Aberconway in his Opening Address to the Daffodil Conference of 1935[5] said: "Of course when flowers are grown in great quantities you are apt to get disease." The probability of the spread of disease is increased by the fact that daffodils are perennials, propagated vegetatively, i. e., by bulb division. "Once a bulb has become infected it never recovers, and the offsets that it produces are also generally infected, but seedlings are invariably free from trouble, at least in the first season, even though they may be obtained from affected plants"[6]. This statement by Moore was confirmed by Broadbent, Green and Walker[4]: "There is no record of a narcissus virus being transmitted through the seed, and we have grown about 5,000 symptomless seedlings from seed collected from plants with yellow stripe and other diseases," but the same authors said: "As it may take from fifteen to twenty years from sowing the seed to marketing a new variety, there is ample time to acquire viruses."

The importance of prevention of infection of seedlings has not been sufficiently appreciated by those who introduce new varieties. One safeguard is to have the seedling beds at a distance

from where the seed and pollen parents are grown. Philip Brierley[3] warned that if one lives in the suburbs, one's neighbors may continually supply aphids carrying virus. Aphids travel considerable distances. Brierley wrote that to avoid this source of infection one should have an "area of half a mile or so free from narcissus." Broadbent, Green and Walker[4] recommended that "seedlings and healthy stocks be isolated from old stocks of narcissi. No minimal distance can be quoted, but 50 yds. is probably enough in practice if other crops intervene." Personally, I would take Brierley's estimate in the case of seedlings, and the shorter estimate for other virus-free stocks.

There are other precautions that one may consider. Seedlings, for the first few years at least, can be grown under aphid-proof screening, which would be necessary only in the spring and early summer when there is foliage. The efficacy of aphid repellents should be determined. They may, however, act like insecticides and irritate the aphids causing increased dissemination of virus.

One could legitimately ask what precautions I personally take in my own plantings. I rogue for yellow stripe. This appears early in the season before aphids are common and begin spreading the virus. As soon as I see the slightest symptom of this disease I dig out the bulb. By this means I keep my plants reasonably free from yellow stripe, though I have some each year. Roguing is ineffective in preventing the spread of those viruses, the symptoms of which appear at the time of bloom or later. The aphids are much more numerous then, and have done their harm before the symptoms are manifest. I do dig out plants that seem badly diseased and those that mature prematurely, but I know that much infection is left. On my daily inspections, I also pick off flowers past their prime on the supposition that aphids find better lodging in the flowers than on the leaves. It is fortunate that viruses are not transmitted easily by mechanical means such as rubbing of leaves, picking flowers or accidental root pruning[8]. If I had to disinfect my knife after each cut, then picking daffodils would indeed be a chore. v.d. Want[9] gave another reason for the prompt removal of spent bloom. He said that aphids are more strongly attracted by yellow than by other colors. Another precaution is taken at the time of replanting lifted bulbs. The appearance of the bulb is often a better indication of disease than the foliage. Unhealthy or poorly developed bulbs are discarded.

Roguing is the chief method of controlling virus recommended to commercial growers. American growers are advised[3] to "rogue their foundation stocks thoroughly, but rogue only

the yellow stripe plants from the commercials." "Old time growers will remember how inverse-roguing—transplanting the clean plants—and mother blocking made a good stock out of even such heavily diseased varieties as Minister Talma. Once a good foundation stock is attained replanting only the largest bulbs tends to reduce the decline complex—white streak and chocolate spot—to a trace."

One difficulty with the inverse-roguing method is that there are many daffodils that are infected, yet show no symptoms; Typhoid Marys", I call them. I have them in my own plantings. For example, daffodils planted near King Alfreds soon showed symptoms of mosaic, though the King Alfreds remained free from symptoms. Daffodils planted near to Camellia or Silver Chimes were likewise infected though the varieties named had no obvious markings. I had a Fairy Circle that was definitely virus infected. After a year in a new location the symptoms vanished and have not reappeared. Yet nearby daffodils become infected. I believe that by inverse roguing the commercial growers did not rid King Alfred of virus, they merely perpetuated a strain that does not show symptoms.

Any daffodil grower who has a King Alfred, a Camellia or a Silver Chimes has a "Typhoid Mary" which may ultimately spread virus to his whole planting. The odds are that most of the daffodils that have been on the market for some time have become infected. In fact, some may have been diseased when they were introduced. Murray Evans wrote [10]: "In nearly 30 years of commercial daffodil growing, we have had a number of older varieties regarded as virus carriers, some disguising the symptoms, others showing them clearly. Stocks of some varieties can be 100% infected with no apparent harm to them. Will Scarlett, Lucifer, Minister Talma, Masterpiece, Beersheba, Sir Watkin, Lord Kitchener, Silver Chimes, Tullus Hostilius and Mary Copeland are some of them. We have seen strays of some of these growing happily 20 years after discard with no virus symptoms visible."

Evans pointed out[11] that the severity of a disease differs from variety to variety. "Fortune, the most widely grown variety in this area next to King Alfred, has now been in commerce for 40 years and virus has never been a serious problem. Some varieties seem to host yellow stripe for years with no apparent harm to them, while others become sickly and emaciated in a very short time after becoming infected. All of the poets we have grown are quite susceptible to yellow stripe, while the poeticus-tazetta hybrids seem to be immune. We do know jonquillas, including juncifolious, are highly susceptible." Varietal

response of daffodils to virus varies greatly as has been pointed out also by Caldwell and Kissick[12] and by Beaumont[13]. Caldwell and Kissick wrote: "The raisers of new varieties could make a contribution to the industry by selecting as parents varieties which are little affected by the disease."

In addition to the "Typhoid Marys", plants of other species may act as a reservoir for virus. Brierley wrote[7]: "Since narcissus virus has no known wild hosts, it should be more easily controlled than cucumber mosaic virus which damages lily, gladiolus and tomato severely." On the other hand, McWorter summarized[2] cases of the transfer of daffodil viruses to other species, and Broadbent, Green and Walker[4] gave references to research indicating that various viruses may be transmitted underground to narcissi via the roots by free-living nematodes. They were particularly concerned over the arabis mosaic virus and recommended that daffodils not be planted near privet or other hedges which are often infected with this virus.

Dr. Boyle at the Pennsylvania State University is studying the virus diseases of deciduous fruit trees[14]. One of his objectives is "to determine the intra- and inter-relationships existing among these and other plant viruses." In his letter he stated: "We would be happy to try to work some of the viruses found in association with narcissus into our interrelationship studies and thus rather indirectly help the cause of your group." Dr. Haasis wrote[15]: "Dr. Boyle's approach to this problem should be encouraged."

The amateur gardener would be glad to have a chemotherapeutic or prophylactic spray or dip that would cure virus infected daffodils or, at least, prevent the spread of infection through his plantings. Several daffodil growers have tried soaking the bulbs in milk before planting. This seemed to reduce the symptoms of yellow stripe. Milk was first suggested by Chester in 1934 to inhibit infectivity of tobacco mosaic virus, and its use has been reported by Hare and Lucas[10]. They were chiefly concerned with contact transmission, and reported that with pepper, tomato and tobacco transmission was prevented or markedly reduced by the use of milk, provided that the plants were sprayed within 24 hours prior to contact with the virus. Haasis[5] pointed out that virus transmission under natural conditions among daffodils is accomplished largely by aphid vectors and by asexual propagation of bulbs originating from diseased mother stocks rather than by contact transmission. He stated: "It is my studied opinion that the 'milk treatment' will not succeed in prevention of virus dissemination among daffodils as it has with tobacco."

In addition to milk, a number of other substances have been investigated for their anti-viral activity, though not tested with

daffodils. Rawlins[17] reported that contact for 6 days with a 0.5% solution of 2-chloroethyltrimethylammonium chloride depressed the multiplication of tobacco mosaic virus in leaf disks by 92%. The virus was not eliminated. Dimond[18] suggested that sulfanilimide be tested in the treatment of virus infected daffodil bulbs since it had cured diseased peach buds of X disease. He warned that this matter would have to be studied in the case of each specific virus.

In general, antibiotics have not been effective against virus diseases. However, Gray reported on an antiviral agent that proved to be the most potent yet encountered for combating local lesion and systemic plant virus infections. This is Cytovirin, isolated from the culture filtrates of an unidentified Streptomyces species. Gray found that local lesion formation by southern bean mosaic virus and tobacco mosaic virus was completely prevented by spray levels of 0.5 to 1 ppm of crystalline Cytovirin. In his published paper[19] he stated, however, that once the virus became thoroughly established throughout the plant, spraying with Cytovirin would not cure the disease. In a letter[20] he wrote: "Cytovirin inhibited multiplication of several plant viruses and under prolonged treatment some viruses appeared to disappear from the plants since they couldn't multiply. The company stopped all work with Cytovirin when they found it was very toxic to animals."

Brierly[7] summed up the work on chemotherapy of viruses by saying that this technique has never completely eliminated virus, but has frequently reduced the concentration of virus significantly. He said: "This is of value in annual crops such as tomato, pepper and tobacco, but of doubtful value in perennials such as narcissus, which would permit the virus to build up again." Despite its failures in the past, chemotherapy seems to be an approach worth continued exploration. It is to be hoped that future investigations will produce more potent drugs or more effective modes of administration. It is suggested that the therapeutic agent might be more effective if the bulb is treated and then kept at as high a temperature as it can stand for a prolonged period,—perhaps several weeks.

Virus diseases of animals have been more successfully combated by immunization than by chemotherapy. In plants, immunization would be desirable, if it could be accomplished. I do not know if the mechanism of forming antibodies is possible with plants, and doubt if plants react to viruses in the same way as do animals. In a newspaper account[21] of a conference on plant virology held at the University of Maryland in July 1963, vaccine for plants was headlined. I have been unable to obtain from Dr.

Hugh D. Sisler, chairman for this conference, any further information on the immunization of plants to viruses, other than that the report of the conference will not be published before this fall. Until this report is released the feasibility of immunization cannot be assessed. It should not, however, be ignored.

Heat has been used to control some virus diseases, such as those of sugar cane and of fruit trees. It might be applicable to daffodils since the cured bulb approximates a dormant bud. However, different viruses vary greatly in their resistance to heat, and the daffodil viruses may survive a temperature lethal to the host. Heat treatment may be divided into two procedures. I shall first deal with that used for the control of nematodes, where the bulbs are heated for only a few hours at as high a temperature as they can stand without injury. Secondly, I shall consider prolonged exposure to heat of lower intensity.

Hot-water treatment saved daffodils when nematodes nearly wiped out the industry. Hot-water treatment may be a major factor in the spread of virus. Even as far back as 1935 Secrett[22] wrote: "It was not until after sterilizing had become a universal practice that the disease started to spread." He had some badly infected bulbs treated and the following year they showed no sign of virus symptoms. Yet after they had been down for two years the trouble again appeared. Pethybridge explained Secrett's experience in terms of temporary suppression of symptoms. van Slogteren and Ouboter[21] likewise reported that virus symptoms may sometimes to a certain degree be masked by hot-water treatment. The disease is not cured, and, being present, can be spread to other bulbs by aphids. Without symptoms, roguing is impossible.

I do not know the temperature at which each of the viruses of daffodils is denatured, but, if they have not been determined, they should be. Since symptoms are suppressed by the hot-water treatment, it is possible that only a slightly higher temperature would be necessary to kill the virus. For propagation stock, some injury to the bulbs could be tolerated. Furthermore, the diffusion of heat to the center of the bulb is a much slower process than most imagine. Probably a preheating for an hour at 100°F. before raising the temperature to 111°F. would ensure adequate heating of the center of large bulbs.

It really does not take a very great increase in temperature to mask symptoms. We have all noted that signs of virus appear in waves. Some years there is practically no indication, and then there is a bad season when many bulbs show stripe. Caldwell and Kissick[12] report that a spell of warm, sunny weather tends to reduce the intensity of the chlorosis. They cite an interesting ex-

periment with a bulb of a virus-infected triandrus hybrid. By alternately warming and cooling it while it grew, they were able to induce alternate green and yellow horizontal bands on the leaves.

It would be of interest to find out how long at various elevated temperatures one could keep daffodil bulbs without killing them. It is possible that prolonged heating, even at relatively moderate temperatures, would be effective in the elimination of viruses. The absence of virus should be proved by serological tests.

The determination of the presence or absence of disease in a bulb is essential in virus research work. Symptoms are not a sufficient guide and, even if they were used, there are no trustworthy, current year symptoms established. van Slogteren and Ouboter[2] have found the serological method to be a great help in their researches, accelerating the decision on a diagnosis from about a year to one or two days. They have prepared antiserum for the principal daffodil viruses. Several virologists, including Drs. Brierley, Gray and Haasis, have emphasized that serological tests are essential to the solution of many of the problems discussed in this paper and that antisera are necessary for these tests.

The only place in the world, so far as I am aware, prepared to test for daffodil viruses by serological techniques is at Lisse,—the Laboratorium voor Bloembollenonderzoek. They have the special facilities and trained personnel to produce the antisera, the most essential and difficult step in virus identification. There are many scientists in the United States competent to use the antisera in testing bulbs. It might be possible for the U. S. Department of Agriculture to purchase antisera from the Netherlands and then test bulbs here. The Department would consider this if a sufficiently strong case were presented to them. It would help if this request were backed up by Congressional pressure.

Once serological testing is available, then bulbs found to be free from virus can be multiplied, and dealers will be able to guarantee virus-free stock.

Though clean stock can be obtained by propagating from bulbs determined free of virus by serological methods, this method fails for a variety that is 100% infected. Morel[23] described a procedure by which healthy plants were obtained from virus-infected dahlias, carnations and potatoes. As a rule, the apical meristem of the central stem remains free from infection.

This was aseptically removed and grown on a special medium to produce a virus-free plant. It is possible that daffodils could likewise be freed from virus.

A better method of obtaining healthy bulbs is that described by Steward with Mapes, Kent and Holsten[24]. Cells of embryo origin are cultured to give a large number of embryoids. These pass through various stages of development to give, finally, complete plants. As many as 100,000 embryoids can be obtained from part of the cells of one embryo. If one starts with cells from an unfertilized embryo, the resulting plants will be genetically like the parent. Since it is known that the embryo of a diseased plant is virus free, the bulbs produced will likewise be healthy. It is not necessary even that it be known that the original embryo came from a healthy or infected plant. Thus, the necessity for a serological examination is avoided.

It is not known whether the above method of cell culture has ever been applied to daffodils. v.d. Want[25] reported that virus-free strains of hyacinths of the varieties King of the Blues and Queen of the Pinks have been obtained by tissue culture. Thus the success of cell culture in providing healthy daffodils is assured[26].

The following references include citations of many letters to me from the large number of virologists who have given data and encouragement essential to the completion of the article.

1. Since this article was published in The 1963 American Daffodil Yearbook, two other articles, reaching the same conclusions, have come to my attention. J. P. H. v.d. Want in Weekbl. Bloemboll Cult. 70, 460-1 (1959) said that insecticides used in bulb crops do not kill the aphids rapidly enough to prevent their infecting the plants. Broadbent, Green and Walker in the R.H.S. Daffodil and Tulip Year Book, 28, 159 (1963) report that at Wisley the use of insecticidal sprays has been abandoned. They wrote: "experiments showed that even persistent or systemic insecticides did not prevent infective aphids from infecting treated plants. Indeed, there was some evidence that DDT caused an increase in spread of yellow stripe, perhaps because it irritated the aphids and made them move more before they died."

2. Slogteren, E. van and Ouboter, M. P. deB.: "Investigations on Virus Diseases of Narcissus." R. H. S. Daffodil and Tulip Year Book, 12, 3-20 (1946).

3. McWhorter, F. P.: "Narcissus. Virus Diseases." Handbook on Bulb Growing and Forcing, publ. by Northwest Bulb Growers Association. pp. 127-130. (1957)

4. Broadbent, L., Green, D. E. and Walker, P.: "Narcissus Virus Diseases." R. H. S. Daffodil and Tulip Year Book, 28, 154-160 (1963).

5. Aberconway, The Lord: "Opening Address. The Daffodil Conference, April 16 to 18, 1935." R. H. S. Daffodil Year-Book, 6, 5-7 (1935).

6. Moore, W. C.: "Diseases of Bulbs." Bulletin No. 117, Ministry of Agriculture and Fisheries, Plant Pathological Laboratory, Harpenden. pp. 77-82 (1949).

7. Brierley, P.: Letter of 11 July 1963 to author.

8. Haasis, F. A.: Letter of 20 Jan. 1964 to author.

9. Want, J. P. H. v.d.: "Bladluis en virus." Weekbl. Bloemboll Cult. 70, 460-1 (1959).

10. Evans, M.: Letter of 20 Nov. 1963 to author.

11. Evans, M.: Letter of 17 July 1964 to author.

12. Caldwell, J. and Kissick, E.: "Varietal Response to Narcissus Stripe Virus." R.H.S. Daffodil and Tulip Year Book, 16, 63-74 (1950).

13. Beaumont, A.: "Narcissus Varieties and their Susceptibility to Pests and Diseases." R. H. S. Daffodil and Tulip Year Book, 16, 75-81 (1950).

14. Boyle, J. S.: Letter of 30 Jan. 1964 to author.

15. Haasis, F. A.: Letter of 24 Feb. 1964 to author.

16. Hare, W. W. and Lucas, G. B.: "Control of Contact Transmission of Tobacco Mosaic Virus with Milk." The Plant Disease Reporter, 43, 152-4 (1959).

17. Rawlins, T. E.: "The Inhibitory Effect of 2-Chloroethyltrimethylammonium Chloride Treatment of Tobacco Mosaic Virus (TMA) Multiplication." The Plant Disease Reporter, 46, 170 (1962).

18. Dimond, A. E.: Letter of 17 Jan. 1964 to author.

19. Gray, R. A.: "Combating Plant Virus Diseases with a New Antiviral Agent, Cytovirin." The Plant Disease Reporter, 41, 576-8 (1957).

20. Gray, R. A.: Letter of 23 Jan. 1964 to author.

21. Hirschmann, E.: "Scientists Discuss Vaccine for Plants." The Evening Sun, Baltimore, p. D1 (11 July 1963).

22. Secrett, F. A.: "Diseases and Pests of Daffodils, their Detection and Control, from a Growers Standpoint." With comments by G. H. Pethybridge. R. H. S. Daffodil Year-Book, 6, 97-111 (1935).

23. Morel, G.: "Guérison de plantes attaintes de maladies à virus." Pap. 14th hort. Cong. 1955. Hort. Abst. 26, 877.

24. Steward, F. C. with Mapes, M. O., Kent, A. E. and Holsten, R. D.: "Growth and Development of Cultured Plant Cells." Science, 143, 20-27 (3 Jan. 1964).

25. Want, J. P. H. v.d.: "Praktische problemen bij onderzoek van virusziekten." Weekbl. Bloemboll Cult. 70, 625, 627 (1960).

26. Culturing simultaneously a sufficient number of embryoids is a very attractive method for obtaining in the shortest possible time a large stock of bulbs for the introduction of a new daffodil.

SUCCESS IN LIFE

He has achieved success who has lived well, laughed often and loved much; who has gained the respect of intelligent men and the love of little children, who has filled his niche and accomplished his task; who has left the world better than he found it, whether by an improved flower, a perfect poem or a rescued soul; who has never lacked appreciation of earth's beauty or failed to express it; who has looked for the best in others and given the best he had; whose life was an inspiration; whose memory is a benediction.

—Mrs. A. J. Stanley

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Mrs. C. T. Singletary, Scranton
Wilson L. Teal, Box 46, Chesterfield 29709
F. W. Thode, 121 Fort Rutledge Road, Clemson
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Mrs. Dan P. Thomson, Jr., 108 Strode Circle, Clemson 29631
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AJ Mrs .Fred A. Allen, 899 Van Leer Drive, Nashville 4
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TENNESSEE, continued

Mrs. Charles Little, 902 W. Brown Road, Lookout Mtn.
Mrs. James E. McCain, 594 S. Graham St., Memphis 38111
Mrs. Sidney L. McGee, Box 68A, Tenn. Tech, Cookeville
SJ Mrs. Glen L. Miller, Jr., 2126 Pete Mitchell Road, Germantown
Mrs. A. L. Moore, 1803 Cedar Lane, Nashville
Mrs. R. G. Morrow, 319 Goodwyn, Memphis 4
Mrs. R. Vance Norfleet, 4735 Walnut Grove Road, Memphis
Mrs. Edward Potter, Jr., 850 Overton Lane, Nashville 37220
Miss Mary B. Ratterman, 201 Peabody Manor, Nashville
Mrs. Roy T. Risley, Route 9, Box 224, Memphis 9
Mrs. A. L. Rowe, 1267 Mayhill Drive, Memphis 16
Mr. Gordon Scott, Cheekwood Botanical Gdns., Nashville 5
AJ Mrs. Julius Seeman, 1233 Nichol Lane, Nashville 5
Mrs. Jack Shannon, 45 S. Norwall Road, Memphis 17
Mrs. Frank J. Smith, 35 S. Fenwick Street, Memphis
Mrs. Geo. G. Smith, 508 W. Spring Street, Lebanon
Mrs. Hugh H. Sprunt, 4036 S. Galloway Drive, Memphis 11
AJ Mrs. Harold E. Stanford, Route 2, Lebanon 37087
SJ Mrs. Roy B. Stewart, 1020 Battlefield Drive, Nashville 4
Mrs. James H. Swann, 4823 Lyons View Road, Knoxville
Mrs. Joseph E. Swann, Route 6, 407 Golf View Drive, Springfield
Mrs. Joe Talbot, III, 6117 Bresslyn Road, Nashville 37205
Mrs. Alex W. Taylor, 4209 Lone Oak Road, Nashville 12
Mrs. Moore Taylor, 827 Rockwood Heights, Clarksville
AJ Mrs. Houston Thomas, 5912 Old Harding Rd., Nashville
Mrs. J. L. Tyler, Sr., 1681 Janis Drive, Memphis 16
Mrs. William J. Tyne, 1301 Chickering Road, Nashville
Mrs. McKay Van Vleet, 194 S. Rose Road, Memphis 17
Mrs. Arthur Whitaker, Box 6, Cumberland Gap
Mrs. Raymond D. White, Route 2, Box 43, Collierville
Mrs. James S. Williams, 4507 Walnut Grove Road, Memphis 17
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SJ Mrs. William Van Winton, 4930 Roane Road, Memphis 17
Mr. and Mrs. Irving Wolfe, 1625 Stokes Lane, Nashville 12
Mrs. Milton Young, 321 W. Forest Avenue, Jackson
Miss Arlene Ziegler, 424 Union Street, Nashville 3
Miss Lois Zimmerman, 3780 Nancy Road, Memphis 18
Mrs. Foster Zuccarello, 124 Clarendon Avenue, Nashville 5

TEXAS

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Mrs. C. R. Bivin, Route 1, Box 218, Overton 75684
Mrs. Howard Brown, Rte. 7, Box 123-B, Fort Worth 19
Mrs. Thomas J. Burke, 4115 Turtle Creek Blvd., Dallas 75219
Mrs. R. Guy Carter, 4926 DeLoache, Dallas 75220
Mrs. Chester R. Cole, 3607 Connell, Dallas 5
Mrs. Felix Doran, Jr., 6930 Turtle Creek Blvd, Dallas
Mrs. George Dubrul, 3431 Lovers Lane, Dallas 9
Mrs. J. R. Dykes, 7035 Delrose, Dallas
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Mrs. Ruth L. Graham, 11021 Swaffer Drive, Dallas 75219
Roy K. Hall, 6857 Blackwood Drive, Dallas 31
Mrs. W. Dow Hamm, 4907 DeLoache, Dallas 20
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SJ Mrs. James K. Kerr, 3920 Cobblestone, Dallas 75229
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Mrs. Nellie Morris, 5363 Waneta, Dallas 75209
AJ Mrs. William D. Owen, 4565 Rheims Place, Dallas 75205
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M. Scruggs — Carruth Garden Club, 4525 Edmondson Avenue, Dallas 75205
SJ Mrs. Harry G. Seeligson, 4417 Belfort Place, Dallas 75205
Mrs. J. O. Smith, 6738 Avalon, Dallas 14
Mrs. Joel K. Smith, Box 352, Palestine
Mrs. Willie R. Smith, 2619 Carolina Way, Houston 77005
AJ Mrs. Francis Stanglin, 11072 Mandalay Drive, Dallas 28
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SJ Mrs. Jay E. Warner, 534 Aqua Drive, Dallas 18
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Mrs. W. C. Woodburn, 802 La Salle, Amarillo

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Mrs. Wm R. Bates, Gloucester
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Rudolph O. Bloomquist, 4652 South 3, Arlington 22204
Mrs. Channing M. Bolton, 1003 Atlanta Street, Fairfax 22030
Mrs. Fred L. Bower, 102 Fairview Avenue, Blacksburg 24060
Mrs. Robert A. Bowman, Route 2, Box 458, Remo 22473
Mrs. George H. Box, Jr., 1203 Sam Lions Trail, Martinsville
Mrs. C. M. Brame, P. O. Box 455, Chase City
Mrs. A. W. Broaddus, RFD 1, Box 306, Mechanicsville
SJ Mrs. A. Gordon Brooks, 202 Portland Place, Richmond
AJ Mrs. J. L. Cabaniss, 1632 Center Hill Drive, S. W., Roanoke
Miss Azeele I. Caruthers, Box 726, Leesburg
Mrs. Claude S. Chadwick, Emory & Henry College, Box KK, Emory 24327
Mrs. F. C. Christian, Barboursville 22923
AJ Mrs. John A. Clem, III, Star Route A, Staunton
Mrs. Thomas B. Cochran, 507 N. View Terrace, Alexandria
Mr. and Mrs. C. Constantine, Gloucester
Mrs. David W. Corson, Locustville
SJ Mrs. Charles M. Cox, 7801 Columbia Pike, Falls Church
George L. Crossman, R.R. 1, Hamilton
Mrs. W. H. Cullen, R.R. 4, Box 413, Fairfax
AJ Mrs. Paul M. Curran, 910 Chain Bridge Road, Fairfax 22030
Mrs. W. Fairlie Dabney, Hartfield 23071
Mr. Richard N. Darden, Jr.
SJ Mrs. Richard N. Darden, Jr., Box 116, Newsoms
AJ Mrs. Curtis R. Davis, 2124 Lennox Road, Richmond 23228
Mrs. Frank G. Davis, 209 College Avenue, Ashland
Mr. and Mrs. J. M. Davidson, Jr., The Dogwoods, Rockbridge Baths
Mrs. James H. Donohue, Jr., 2330 Monument Avenue, Richmond
Mrs. Arthur A. Dugdale, P. O. Box 25, Ashland 23005
AJ Mrs. John M. Durbin, P. O. Box 157, Wachapreague
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Mrs. F. G. Farinholt, White Stone
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AJ Mrs. W. Kent Ford, Clifton Forge
Mr. Edward L. Gates
SJ Mr. Edward L. Gates, 6417 Brookside Drive, Alexandria

VIRGINIA, continued

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AJ Mrs. Bruce Gunnell, 3831 Franconia Road, Alexandria 22310
AJ Mrs. H. W. Harris, 414 Franklin Street, Alexandria
Mrs. J. B. Harris, Sr., 2300 Indian Hill Road, Lynchburg
Mrs. Julian Harris, Chatham
George W. Heath, Gloucester
Mrs. F. Tucker Henley, 2nd, 205 Lock Lane, Richmond
H. de Shields Henley, Box 251 A, Maxwell Lane, Newport News
Mrs. Henry T. Holladay, Jr., Red Rock, Rapidan
Mrs. Selina L. Hopkins, Route 3, Gloucester 23061
Mrs. L. F. Hubbard, 3101 Hubbard Road, S.W., Roanoke
Mrs. G. Lyle Hughes, Wicomico Church
Mrs. R. Lee Humbert, Box 165, Blacksburg 24060
Mrs. Stanhope S. Johnson, 2600 Link Road, Lynchburg
AJ Mrs. William C. Jones, 4910 Evelyn Byrd Road, Richmond 23225
Mr. and Mrs. Upshur Joyner, 4403 Victoria Blvd., Hampton
Mrs. Nathan H. Key, 1520 Terrace Road, Roanoke 15
Mrs. Chester F. Kruszyna, Clearwater Park, Route 1, Box 332, Covington 24426
Mrs. C. L. Ladson, RFD 1, Box 65, Lancaster
AJ Mrs. E. E. Lawler, Jr., P. O. Box 327, Alexandria
Mrs. Robert E. Lee, 2021 Spottswood Road, Charlottesville
Mrs. H. G. Leggett, Jr., 1704 Lexington Drive, Lynchburg
Mrs. Wally W. Levi, 605 Third Street, Radford
SJ Mrs. A. L. Lorraine, 400 Sleepy Hollow Road, Richmond
Mrs. Moncure N. Lyon, Purcellville 22123
Mrs. Henry D. Ludwig, 309 S. Payne Street, Fairfax
Mrs. James McBride, 138 Milstead Road, Newport News
Mrs. John A. McDanald, 214 East Fudge Street, Covington 24426
L. G. McNairy, 5124 8th Road, North, Arlington 22205
Mrs. James B. Martin, Kittery Point, Gloucester
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Mrs. L. Lewellyn Miller, RFD No. 2, Charlottesville
SJ Mrs. E. H. Moore, 2515 Willow Lawn Street, S.W., Roanoke
Mr. P. R. Moore, Jr.
SJ Mrs. P. R. Moore, Jr., 811 Marshall Street, Hampton
Miss Frances Moreland, 140 Melrose Avenue, Hampton
Mrs. C. P. Nair, Jr., 504 McCormick Blvd., Clifton Forge
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AJ William G. Pannill, P. O. Box 31, Martinsville

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Mrs. Newson O. Price, 107 Wharton, Blacksburg 24060
Mrs. W. B. Rasnake, Route 4, Box 425, Roanoke
SJ Mrs. C. Lathrop Reed, Box 60, River Road, Richmond
Mrs. A. W. Rice, 2817 Avenham Avenue, S.W., Roanoke
Mrs. John P. Robinson, Palmer 22533
Miss Lois H. Robinson, 1500 Chesapeake Avenue, Hampton 23361
Mrs. Webster S. Roads, Jr., Elmington, Gloucester
Mr. and Mrs. Hennings Rountree, Jr., 276 Harris Creek Road, Hampton 23369
Mrs. E. R. Rush, 907 Jefferson Circle, Martinsville 24112
Mrs. Paul E. Sackett, 2003 Link Road, Lynchburg
Mrs. Ralph E. Sampson, 4622 N. 32nd Street, Arlington 7
AJ Mrs. Alfred B. Schad, 214 Canterbury Road, Richmond 23221
SJ Mrs. William C. Seipp, Herron's Court, Middleburg
SJ Mr. F. D. Seney
Mrs. F. D. Seney, 35 Greenwood Road, Newport News
Huntington D. Sheldon, 4402 Ramshorn Place, McLean
Mrs. Herman E. Sidwell, 232 Dexter Drive, Falls Church
Mrs. Evelyn D. Swift, Remo
Mrs. William K. Taylor, Box 158, Clarksville
SJ Miss Sarah Terry, 79 Oakville Road, Hampton 23369
W. O. Ticknor, 206 E. Greenway Blvd., Falls Church
AJ Harry I. Tuggle, Jr., 709 E. Indian Trail, Box 1108, Martinsville 24112
Mrs. Harry I. Tuggle, Jr., Box 1108 Martinsville 24112
Mrs. John Tyssowski, Cobbler Mtn. Farm, Delaplane
Mrs. Omer Utt, 406 Euclid Avenue, Lynchburg
Mrs. Reginald Vance, Gloucester 23061
Mrs. Charles E. Via, 2302 Carter Rd., S.W., Roanoke
Va. Polytechnic Inst., Dept. of Floriculture, Blacksburg
SJ Mrs. J. Robert Walker, 501 Mulberry Box 1264, Martinsville 24112
Mrs. Samuel S. Walker, 914 Mulberry Road, Martinsville
Gerald D. Waltz, P. O. Box 977, Salem
Mrs. James Warren, Jr., 17 Grace Street, Harrisonburg
George C. Watson, 1145 Overbrook Road, Petersburg 23805
AJ Mrs. Robert W. Wheat, III, Route 2, Box 34, Lorton
AJ Willis H. Wheeler, 3171 N. Quincy Street, Arlington 22207
AJ Mrs. Robert M. Whiting, 6303 Park Street, Alexandria 22312
Mr. Berkeley S. William, Jr.,
AJ Mrs. Berkeley S. William, Jr., 364 Albemarle Avenue, Richmond 26
Mr. and Mrs. Leon Winters, Box 24, Hayes

WASHINGTON

Mrs. Richard Bradbury, 612 Grand Blvd., Vancouver 98661
Robert F. Cheyney, Box A, Medical Lake 99022
Mrs. Frances Finney, Route 1, Box 107, Onaluska 95870
Miles B. Hatch, Alderton
Richard G. Jones, c/o Vet. Hospital, Walla Walla
Mrs. Tressa McMurry, 2311 Valencia Street, Bellingham
Mrs. Alfred H. Monahan, 1315 Tower Avenue, Raymond
Richard L. Nowadnick, Northwest Bulb Growers, Skagit Valley Jr. College, Mt. Vernon
Mrs. H. H. Simmons, 13042 Pacific Hwy. S. Seattle 98168
Mrs. Reuben Stohr, 1512 Grand Avenue, Centralia

WEST VIRGINIA

AJ Mrs. Ernest J. Adams, 1121 12th Avenue, Huntington
Mr. Elmo L. Agee
SJ Mrs. Elmo L. Agee, 2405 Mountain View Avenue Bluefield
Huntington 25701
Mrs. Alex Booth, 145 Ridgewood Road,
Mrs. Joe W. Dingess, 151 Kings Highway, Roland Park, Huntington
Mrs. R. H. Dollison, 727 Mt. Vernon Avenue, Fairmont
Mrs. H. E. Duncan, 3218 Brandon Road, Huntington
Mr. and Mrs. Thompson Chandler, 905 Evanwood Road, Charleston 25314
Mrs. C. E. Fitzwater, 2000 Inwood Road, Huntington
Mr. G. H. Gunnoe,
AJ Mrs. G. H. Gunnoe, 723 3rd Street, South Side, Huntington
Mrs. P. E. Jordan, Box 602, Follansbee
Mrs. A. S. Lucas, 103 New Street, Shepherdstown
Stewart McReynolds, 703 Mulberry Avenue, Clarksburg
Mrs. Carlton R. Mabley, Jr., 812 13th Avenue, Huntington 25701
SJ Mrs. Lewis A. Miller, 2202 3rd Avenue, Huntington
Mrs. Grady Risen, 125 Ridgewood Rd., Huntington
Mrs. Larry Schavul, 55 South Altamont Road, Huntington
Mrs. Boyd Smoot, 2 Pinevrest Drive, Huntington
Mrs. A. W. Steller, 100 Magood Avenue, Princeton
W. L. Tolstead, Davis and Elkins College, Elkins
Mrs. Paige C. Westfall, Route 5, Parkersburg
Mrs. H. H. Williams, Shepherdstown
Mrs. John R. Witt, 204 Oak Dell Avenue Bluefield

CANADA

F. S. Kirby, 9190 E. Saanich Road, Sidney, B. C.
Miss Ruby Pulsiver, Box 139, Chester, Nova Scotia
Frank E. C. Smith, Box 128, Lillooet, B. C.
James W. Watson, 687 No. 7 Road, R. R. 2, Richmond, B. C.

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A. Horinka, 17 Kitamomo-dani, Mimamiku, Osaka, Japan
Royal Hort. Society, Vincent Square, London, S.W. 1, England
SJ Mrs. R. Rowland Timms, Chosun Hotel, Seoul, Korea
C. R. Wooton, 119 Lichfield Road, Bloxwich, Walsall, Staffs., England
Mrs. H. Yahel, Natl. & U. Inst. of Agri., Experimental Research Sta., Rehovot, Israel
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